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the #1 magazine of computer applications and software

ELECTRONIC SPREADSHEETS

In-Depth Evaluations:

- Epson QX-10
- Corvus Concept
- Sord IS-11
- Memotech MTX-512
- AppleWorks
- Idea Processor
- TermExec
- Galaxy Search
- Spellagraph
- 7 New Games
- Reading Comprehension

Special Section: Choosing And Using An Electronic Spreadsheet

The Perils Of Computer Shopping

Tutorial: Structured Programming In Basic

Mathematics And Computer Art

Michael Crichton: Mousetrap

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COMMAND OF THE LANGUAGE

It's staggering.

It can change the way you work, the way you think, the way you live.

It can help you create, re-create, and replicate.

It's for secretaries, statesmen, salespeople, students, song-writers and story-tellers.

It is more than just an incredible time-saver (although it certainly is that, too). Much, much more.

It's a tool that propels you into creativity, letting you set down an idea, rearrange it, edit it, improve it, decide you liked it better the first time, change Smith to Jones wherever Smith appears, switch paragraphs around, personalize things that ought to be personal, see how what you've written would look with different margins, in all capital letters, or with boldface headings, add or delete names or numbers from lists, file away fleeting ideas and retrieve them whenever you want them, automatically show you a "table of contents" of all your ideas in case you've forgotten them, put a notion on "hold" while you do something else, and prod you into certain secret places that your mind has seldom, if ever before, entered.

It lets you do all this on an IBM® PC on a single 5¼" disk. Add a hard disk, and it can contain up to two file-cabinet drawersful of information, each drawer containing up to 32 file folders, each folder containing up to 32 pieces of electronic "paper" containing anything from a single sentence to a thousand page book.

This is command of the language.

This is Leading Edge Word Processing™.

THINGS IN GENERAL:

In a nutshell, Leading Edge® is big word processing for the small computer.

It's the simplest, yet most powerful word processing program ever created for sophisticated Personal Computers like the IBM® (or the even more-powerful Leading Edge PC).

You can learn the basics of the system in a matter of minutes, master it in a matter of hours, and never outgrow it in a lifetime.

If you've been using another word-processing package, either you've been working too hard, or it hasn't been working hard enough.

Thanks to this program, even the most complex functions are typically reduced to just one or two keystrokes. And thanks to an impeccably logical and easy-to-reference Operator's Manual, you can quickly flip to any function you want to perform, and immediately start performing it.

So you can hunt and peck your way into the future, or (if you're already a good typist) . . . you can fly.

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THINGS THAT MAKE IT SIMPLE

A MANUAL THAT'S A HELP, NOT A HINDRANCE
An elegantly logical User's Manual written by non-technical writers, tested on beginners and experts alike, with simple, intelligent illustration, examples, and instructions, tab-indexed for instant access to any word-processing function.

SIMPLE LEARNING AIDS TAILORED TO YOUR ABILITY
Learning is easy—and actually fun—at every level, beginning with a Beginners' Guidebook and an interactive training disk that gives you on-screen instructions and holds your hand as it walks you through the basics step by step. After that, there's a "shorthand" cue card and keyboard overlay that refresh your memory at a glance. Most people start to do basic word-processing in less than one hour.

THE MOST HELPFUL "HELP" KEY YOU'LL EVER PRESS.
Gives you exactly the information you want, whenever you want it.

CLEAR, HELPFUL MENUS
Type two keys, and your screen gives you a "table of contents"—to let you "call-up" anything you've written, so you can revise it, update it, discard it, or print it.

BYPASS THE MENU
The menus are there if you want them. If you don't, fly nonstop to what you want using the menu bypass.

SIMPLE COMMANDS
Simple one- and two-keystroke commands mean you have no complicated codes to memorize.

LOGICAL DESIGN
So logical that when you know how one thing works, you know how a dozen other things work.

DESIGNED SPECIFICALLY FOR THE IBM OR LEADING EDGE PC KEYBOARD AND COMPUTER
To take advantage of all the power these PC's are capable of, with the greatest amount of simplicity.

THINGS THAT MAKE IT FAST

THE FASTEST CURSOR MOVES IN WORD PROCESSING
More moves with fewer keystrokes than any other system at any price. You can instantly move to the next character, next word, next sentence, the next line, the next page, or to the end of an entire document.

GO TO ANY PAGE INSTANTLY
Just tell Leading Edge Word Processing what page you want, and you get it.

"DO IT" KEY MAKES BIG CHANGES WITH ONE KEYSTROKE
The simplest, fastest way to insert, delete, and move big blocks of text. (This is the "execute," or "plus" key on the IBM or Leading Edge PC.)

CHANGE A FORMAT IN SECONDS
Without leaving page or letter or memo or other document you're working on, you can see how it would look with different margins, indented, or in all capital letters; or with boldface headings, etc.

BLOCK INDENT
You don't have to hit the tab key on every line to create a temporary margin. (Great for columns of figures, sub-paragraphs, outlines, etc.)

DIRECT-DIAL DOCUMENTS FROM THE DIRECTORY
Just highlight the document you want (using the cursor keys), and you'll get it, simply by hitting the execute key.

HOT PRINT
Print any portion of a document, from one line to an entire document.

DOT LEADER TAB
Useful for things like tables of contents.

TRANSPOSE KEY
Corrects the most common mistake in typing: One stroke turns "teh" into "the."

LEADING EDGE PRODUCTS, INC., SOFTWARE SALES DIVISION, 55 PROVIDENCE HIGHWAY, NORWOOD, MA 02062, 1-800-423-0300. IN MASSACHUSETTS, (617) 769-8770

THINGS THAT MAKE IT EASY

ONE-KEY INSERT AND DELETE
Lets you do word processing's two most common functions the simplest possible way.

MARGIN AND TAB SETTINGS AS EASY AS ON A TYPEWRITER
No other word-processing system of any size makes it this easy. You can even adjust both left and right margins on-screen.

THE SCREEN SHOWS YOU WHAT YOU'RE GETTING
You don't have to wait until it's printed. You see margins, line breaks, underlines, page breaks, etc., as they will appear.

JUSTIFIED, OR RAGGED-RIGHT
And see it on the screen the way it'll appear when it's printed.

ANY NUMBER OF FORMATS IN A SINGLE DOCUMENT
Order different margins, tabs, line-spacing—anything—for any section of a document.

HEADERS AND FOOTERS OF ANY LENGTH
The document name, page number, or other information is printed automatically at the top or bottom of any page, or every other page, or wherever.

PRINT ANY PAGE IN THE FILE
You don't have to print a whole document. Just punch in the page number.

HARD PAGE BREAK
Lets you tell the system where you want pages to break.

HARD AND SOFT SPACES AND HYPHENS
You can tell the program which words must go together on the same line, which words must be hyphenated.

WIDOWS AND ORPHANS
The system automatically breaks pages to avoid leaving unsightly single lines or partial paragraphs at the bottom or top of a page—unless you want them there.

FRACTIONAL LINE SPACING
1½-line spacing is as easy to order on Leading Edge Word Processing as on a typewriter.

TEXT THAT'S WIDER THAN THE SCREEN
Horizontal scrolling allows you to create documents up to 200 characters wide.

THINGS THAT MAKE IT PROFESSIONAL

ONE-KEY CUT AND PASTE
Lets you move pieces of text around like matchsticks with far fewer keystrokes than other systems.

ONE-KEY CENTERING
And the line (or block of type) stays centered even when you change it.

AUTOMATIC REFORMATTING
You don't have to clean up a paragraph after you edit it. Leading Edge Word Processing does it for you.

THE BEST UNDERLINE YOU CAN BUY
As easy as a typewriter. And it shows on the screen as an underline.

BIG-SYSTEM BLOCK FUNCTIONS
Leading Edge Word Processing deletes, inserts, and performs other changes on large blocks of text through the use of forward and backward highlighting.

SCRATCH PAD
Gives you "scrap paper" in the middle of a document for working on text. When you're finished, you can insert the text, discard it, or even cut it out and paste it somewhere else.

NAME DOCUMENTS THE WAY YOU WANT
No codes needed. You can call a letter to Mom "Letter to Mom."

SPLIT SCREEN/WINDOWS
This big-system feature puts two documents on the screen at the same time so you can copy from one to another.

BOLD, SUBSCRIPTS, SUPERSCRIPTS, STRIKETHRU, AND LETTERS DOUBLE-WIDE
You get to see them on the screen, and you don't have to go through a big rigamarole to get them.

U.S. AND FOREIGN DECIMAL TABS
Automatically line up the decimal in its proper place in a column of numbers.

THINGS THAT GIVE YOU PEACE

A REAL LIVE PERSON
In the unlikely event that your system ever "crashes," or you need help with any feature or function, there's a toll-free hot-line that connects you to an expert tele-diagnostician who can give you an instant answer. 1-800-523-HELP—in Massachusetts, 617-449-6060.

AUTOMATIC SAVE
While you are editing, or creating a document, Leading Edge Word Processing automatically makes a copy every 15 seconds. So your work is saved, even if the power fails.

AUTOMATIC DOCUMENT BACKUP
Every document is automatically copied twice onto your file disk, if you choose to do so. So if an accident happens to one document, you still have a copy. (Don't worry. Your writing's not going to get lost in some electronic blackhole.)

RECALL OF DELETED TEXT
If you delete text by accident or change your mind, you can get it back.

CUSTOMER PROTECTION PLAN
Your Leading Edge Word Processing is guaranteed forever. If you should accidentally destroy it, we'll replace it at a nominal cost. Whenever we upgrade it, we'll give you an updated program at a nominal cost.

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CIRCLE 163 ON READER SERVICE CARD

"Borland's Turbo Pascal is a giant step in the right direction."
Jerry Pournelle, *Byte,* April, 1984

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Pascal is structured. It's designed not to tangle. What a relief!

Many of us began programming in Pascal because more than once, we'd come smack up against Murphy's first laws of BASIC: GOTOS DON'T and GOSUBS **NEVER** RETURN!!

You can name variables what you will. Instead of "R", you can call your variable "RateOfSpeed". It makes sense. And its modular structure allows for the greatest ease of program maintenance.

Of course, some of the new BASICs have variations of these features, but, as anyone who's ever tried to write a game in BASIC knows, its an awfully slow language in execution. Programs written in Turbo Pascal run many times faster!

If you're wondering why BASIC has overshadowed Pascal until this year, the answer is really quite simple. BASIC, as I'm sure most of you know, comes "bundled" with almost every microcomputer. It, therefore, became the "default" language.

In the past, to convert to a usable Pascal was, at the very least, an expensive proposition.

Our predecessors were costly ($300-$900), occupied huge amounts of disk space, and most required a separate editor. It's no wonder BASIC predominated for so long.

Therefore, until the introduction of Turbo Pascal, this powerful language remained a language of professionals.

Now . . . with the advent of Turbo Pascal . . . Pascal is a language for everyone who programs. It comes with a built-in editor, occupies only 33K of your precious memory and is menu-driven for true programming ease.

And Turbo Pascal compiles up to 97 times faster than any other Pascal compiler around! Yet, it offers all the features and extensions you ever dreamed of; even a windowing procedure for the IBM PC!

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As **Bruce Webster** said in *Softalk IBM* in March 1984,

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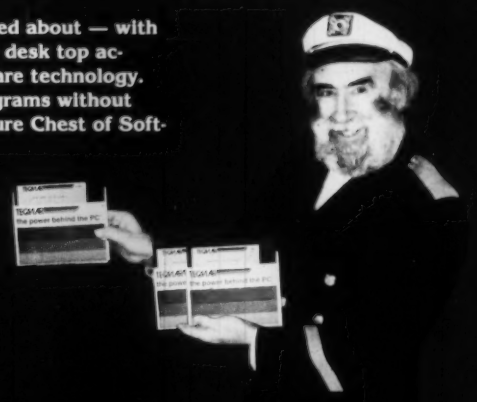

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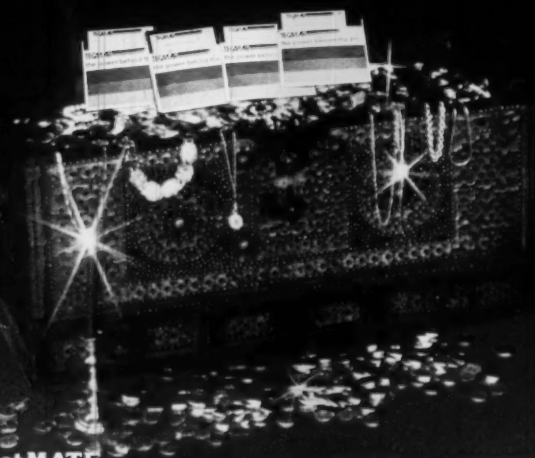

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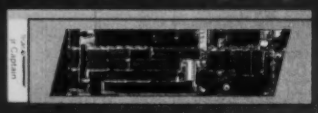

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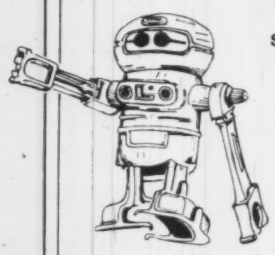

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No matter how heavy the traffic, our new Qantex 7065 multimode printer will keep your documents flowing smoothly. At a very affordable price.

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The 7065 is also a dot addressable graphics printer with resolution to 144 x 144 dots per inch and a full complement of line drawing graphics.

Besides being very fast, the 7065 is very compatible — with IBM, Apple, Lotus 1-2-3 and just about any other personal computer or software on the market. It offers built-in bar code capability. And its 500-million-plus character print head and industrial quality construction are designed for long, hard use.

To find out how quickly the Qantex 7065 could bring your information processing up to speed, contact Qantex for details or a demo. Qantex, 60 Plant Avenue, Hauppauge, NY 11788. Call toll-free 800-645-5292; in New York State 516-582-6060.

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Street Price Index

The Creative Computing Street Price Index is an on-going monitor of the prices of selected computers, peripherals, and software packages.

This Index is not meant to be a purchasing guide. We emphatically do not recommend that you purchase a product based on price alone. Equally important are customer service, delivery, warranty, return policy, and provision for maintenance.

Some of the prices in the Index were obtained with the cooperation of Computer Price Alert, a newsletter which lists comparative prices on 300 items per issue. Annual subscription price (20 issues) is $48 from Computer Price Alert, P.O. Box 574, Cambridge, MA 02138. ■

Computer	List	Apr. 1984 Lowest
Apple IIe (starter)	$1995	$1329
Atari 600 XL, 16K	199	149
Atari 800 XL	299	200
Commodore 64	595	179
Eagle PC-2, 128K, 2 dr	3495	2495
Franklin Ace 1200 OMS		1495
HP 150, 128K, 2 drives	3995	3295
IBM PC, 128K, 2 drives, green IBM monitor		2940
NEC 8201, 16K	795	589
Radio Shack:		
Color Comp, 16K, ext	199	149
Model 4, 64K, 2 dr.	1999	1495
Model 100, 24K	999	720
Timex 2068	199	99
Line Printer		
Anadex DP-9501	1725	1099
Diablo 630	2340	1689
Epson FX-80	699	519
Epson RX-80	595	269
IDS Prism 80	699	529
NEC 8023A	795	379
Okidata 82A	749	299
Okidata 92	699	425
Prowriter 8510P	695	329
Star Gemini 10X	449	255

Monitor	List	Apr. 1984 Lowest
Amdek 310 amber	230	159
Amdek Color I	379	289
Amdek Color II	529	410
Princeton HX-12 RGB	695	469
Quadchrome 12" RGB	795	499
Taxan 12" amber	205	122
Zenith 123 12" green	150	89
Software		
Bank Street Writer	70	42
Condor 3	650	349
dBase II	700	365
Dow Jones Mkt Analyzer	350	245
EasyWriter II	350	185
Friday	295	155
Home Accountant +	150	85
Lotus 1-2-3	495	289
Magic Window II	150	88
Multiplan	275	129
PFS:File	140	79
PFS:Graph	140	79
Perfect Writer	489	149
Screen Writer II	130	82
SuperCalc 3	395	199
TK!Solver	299	179
VisiCalc Advanced	400	259
Volkswriter	195	115
WordStar	495	225
Zork (any one)	50	26

A Note To Our Readers

Product evaluations in *Creative Computing* are different from those in many other magazines. Here's why.

A *Creative Computing* product evaluation is objective, thorough, and in-depth. Normally, we get an actual production product for testing—on loan or purchased from the manufacturer. We do not ask for or accept any special treatment, but interact with the manufacturer as a normal customer would.

In most cases, we test the product in the environment and under the conditions in which we would expect it to be used. We do not believe that we should sit in an ivory tower and pass judgment on a product that is meant to be used by a salesman on the road or a child in a classsroom.

When we evaluate a prototype, we state that fact in the review. Even so, we do not simply recite the manufacturer specifications; instead, we use the product, apply our own tests, and report on the results. If it lives up to the published specs, fine; if not, we tell you.

In our evaluations, we call a spade a spade and a lemon a lemon. Advertisers do not receive special treatment—no one does. Some manufacturers do not like this policy and refuse to work with us or advertise in the magazine. But most manufacturers welcome our policy of scrupulous honesty, and for that, we applaud them.

Nevertheless, we are not right all of the time. Sometimes, a unit might perform well in our tests, but be a dog for you. For that, we are sorry. But for the most part, we trust you will find our reviews—and the rest of the magazine—credible, honest, and interesting. ■

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Graphics Master is the only board that creates *both monochrome* and *color* graphics for Lotus 1-2-3.
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CIRCLE 179 ON READER SERVICE CARD

Input/Output

Qwerty vs. Dvorak

Dear Editor:

I have to **assume** that the "Inside Dreck" article that appeared in your April issue on page 232 was something of a **satire** of my *InfoWorld* column "Inside Track."

When I read it aloud in front of my Tuesday support group they were **shocked**. I needed a long session in the hot tub with a bottle of '45 Mouton to get over the **terrifying reality** that my column is viewed as anything but objective, fine tuned, creative, well thought out, and **philanthropic**.

After a few full snifters of **Hennessy Paradis** I jumped in the waterbed and tried to get some sleep, but, alas, it was impossible.

You and your band of **reverse engineered** wine snobs have ruined my life!

John C. Dvorak
Berkeley, CA

Sounds like things are tough right now, John, and we're sorry. But look at the bright side—you could be worse off. I mean, at least you don't have the Clapp!—JJA

Cole Minder

Dear Editor:

We were delighted to read the nice review by Susan Glinert-Cole of our book *A Guide To Programming The IBM Personal Computer*, by Bruce Presley, in your September issue. We would, however, like to make one correction. The book is published by Lawrenceville Press, Inc., and not Van Nostrand Reinhold, with whom we've contracted for distribution.

We would also like to respond to Ms. Glinert-Cole's comments about numbering chapters separately. We are constantly in the process of updating our books; if it were necessary to re-number all pages each time we add something to a chapter it would become a major, and expensive, undertaking.

Your readers might also be interested in knowing that we publish Basic programming texts in the same format for the Apple, Commodore, and Radio Shack computers.

Carol S. Tibbetts
Vice President
Lawrenceville Press Inc.
P.O. Box 6167
Lawrenceville, NJ 08648

Changing Landscape

Dear Editor:

Despite your statement in the January issue (p. 231) that there is no regular boo-boo department in *Creative Computing* because such a feature is usually unnecessary, there does seem to be a problem with the Random Landscapes program in the same issue.

The program won't work on the Apple II unless the Y in line 940 of the "lines to be added for the Apple II screen" is changed to R1.

There is also something peculiar in line 540, in the part after the colon. There is a B that doesn't seem to appear anywhere else in the program and there is a single left bracket. The program seems to run fine without the statement after the colon.

Other than that, it's a great program!

Jim Tankard
3033 Cherry Ln.
Austin, TX 78703

Notices

Tall (and Short) Tales Wanted

As most of you know by now, the November 1984 issue of *Creative Computing* will celebrate the tenth anniversary of the magazine. As part of this issue, we have invited leaders of the industry to contribute articles and other material. The outpouring has been overwhelming!

However, we would like your help also. What funny things have happened to you in computing over the past ten years? Do you have any interesting stories to tell? What would you like to share with our readers? What was important to you? How did your first computer blow up?

Please keep your anecdotes short (250 words maximum) and pithy. Please type, double spaced, with ample margins. Include a photo if appropriate. Everything must reach us no later than August 1 to be considered for inclusion.

Send to Tenth Anniversary Issue, Creative Computing, 39 E. Hanover Ave., Morris Plains, NJ 07950.

WCCE '85

The World Conference on Computers in Education (WCCE) provides a forum for discussion among all individuals who have an interest in educational computing.

The fourth WCCE will be sponsored by TC-3, the Technical Committee for Education of the International Federation for Information Processing (IFIP), from July 29 to August 2, 1985 in Norfolk, VA.

Authors are invited to submit papers describing actual experiences using computers in the classroom or the consequences of such use on the educational process. Papers should report concrete results, or be survey or tutorial papers which include a synthesis and thorough evaluation. Deadline for papers is August 1, 1984.

Send papers to: John McGregor, Department of Computer Studies, Murray State University, Murray, KY 42071 USA.

Creative Computing on CompuServe

The Creative Computing SIG is available on the CompuServe Information Service. The SIG features news, information, programming hints and fixes, the Street Price Index, and a download section of programs from the magazine. Type GO PCS-22 at any ! prompt.

Exodus: Ultima III

On page 120 of our April, 1984 issue we stated that *Exodus: Ultima III* was the end of the Ultima series. Origin Systems informs us that another adventure will be released by the end of 1984.

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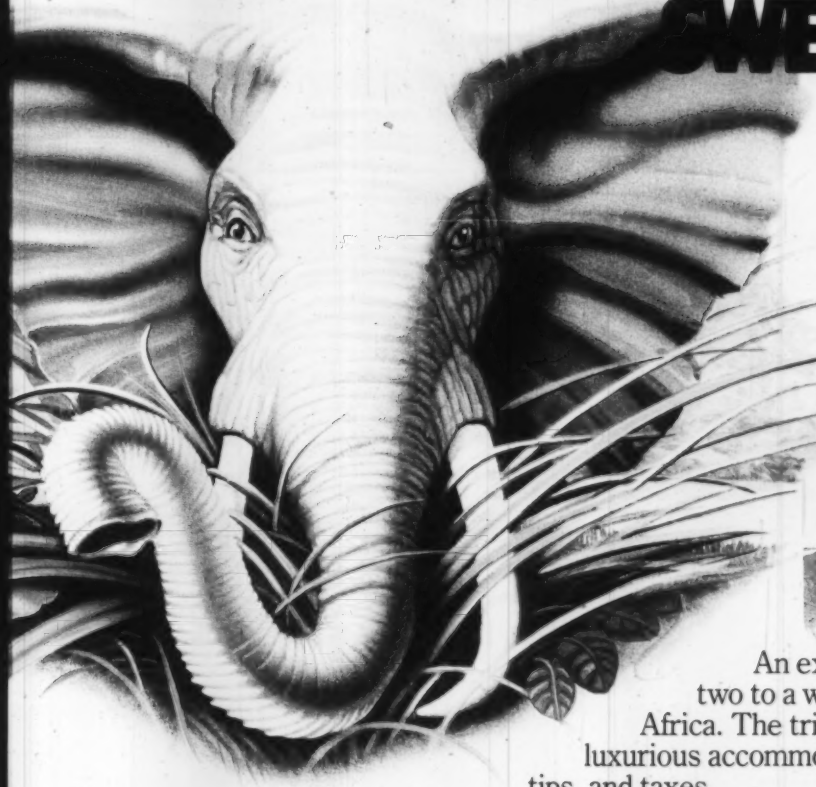

GRAND PRIZE

(1 winner)

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SECOND PRIZE

(25 winners)

A Bell & Howell 35mm camera. The 35J complete with fine Lumina lens completely eliminates complicated focusing.

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A Deluxe Camping Package featuring an 8′ x 10′ Wenzel Cabin Tent, four Wenzel sleeping bags, plus a Coleman lantern, stove and cooler.

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Camouflage Nylon Duffle Bag. This handsome bag is water repellent and double reinforced at all stress points.

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CIRCLE 143 ON READER SERVICE CARD

Don't Miss The Tenth Anniversary Issue!

Appearing in the Tenth Anniversary Issue of *Creative Computing* will be the most distinguished lineup of authors ever assembled in the history of computing: Scott Adams • David Ahl • John Anderson • Gordon Bell • Saul Bernstein • Alfred Bork • Dan Bricklin • Ken Brumbaugh • Bill Budge • David Bunnell • Jake Commander • Michael Crichton • Tom Dwyer • Philip Estridge • David Fox • Dave Freeman • Harry Garland • Bill Gates • Bill Godbout • Dave Gordon • Stephen Gray • Wayne Green • Tim Hartnell • Dick Heiser • Carl Helmers • Steve Hunka • Egil Juliussen • Mitch Kapor • Alan Kay • John Kemeny • Walter Koetke • Tom Kurtz • David Levy • Jim Levy • Sol Libes • David Lien • David Lubar • Art Luehrmann • Forrest Mims • Chris Morgan • Dave Moursund • George Morrow • Adam Osborne • Chuck Peddle • Harvard Pennington • John Roach • Peter Rodwell • Ben Rosen • Seymour Rubinstein • Chris Rutkowski • Michael Shrayer • Clive Sinclair • Les Solomon • Tom Stonier • David Tebbutt • Paul Terrell • Ken Uston • Stan Viet • Jim Warren • Rodnay Zaks • Ed Zaron.

All these people and many more will appear in the spectacular tenth anniversary (November 1984) issue of *Creative Computing*. Don't miss it! Be sure your subscription is current—this is sure to be an instant sellout on the newsstand.

SAMS APE ESCAPE BRINGS OUT THE ANIMAL IN YOU.

Introducing Sams APE ESCAPE, the fast-action game that will have you scaling tall buildings, riding balloons, avoiding hazards and evading capture at heights that would scare even King Kong.

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CIRCLE 201 ON READER SERVICE CARD

THE BEST REASON FOR HAVING A HOME COMPUTER.

Your children. That's why we created the Early Games series for them. We're educators as well as computer specialists. We create games that teach children important skills.

There are five programs in the Early Games series. **Early Games for Young Children** is a set of nine entertaining activities for children 2½ to 6. They can work with numbers and letters and create colorful pictures. **Matchmaker** uses shapes, sizes, directions and colors to help children develop reading readiness skills. Children ages 5 to 12 can learn to play melodies with Early Games **Music.** Our **Piece of Cake** turns math problems into, well, a piece of cake. And **Fraction Factory** takes the work out of fractions.

Early Games feature multiple activities, easy to use picture menus, and colorful graphics. The games are fun, children love to play them! That's why they learn from them.

And they're the best reason for having a home computer.

CSI

counterpoint software inc.

If getting the whole family together is a real challenge, maybe you need games that really challenge the whole family.

Introducing a new generation of computer games. Family Learning Games from Spinnaker.

Ever notice how a little fun with the family can be a little hard to arrange?

Well, now there's a solution – Spinnaker's Family Learning Games. A whole family of great games that make getting the family together seem like child's play. And make "family fun" really seem like fun again. What's more, they'll even help your kids develop some very important skills.

What makes our Family Learning Games so special? Well, for one thing they're designed to challenge and excite everyone in the family, from grade schoolers to grownups. Their unique combination of chance and strategy makes them perfect for young players, yet challenging enough that everyone will want to play them again and again.

But what makes our Family Learning Games even more unique is how they help kids learn – about problem solving, strategizing, spelling, even Greek mythology. That's quite a bit more than they'd learn from a typical board game (if you could even get them to play a typical board game).

So next time you want to get everybody together, don't get discouraged – get Spinnaker's Family Learning Games.

You'll find the biggest challenge in family fun won't be on the refrigerator. It'll be on the computer.

Spinnaker games are available for ColecoVision® and Coleco Adam,™ Commodore 64™ and Atari® home computers.

It's New! JUKEBOX.™

It's a musical strategy game that's kind of a cross between a chess match and a dance contest. To keep the music bopping, you've got to keep your feet hopping – but don't get boxed in, or the jukebox will stop!
Ages 8 - Adult.

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Where do monsters lurk? And which islands have treasures to behold? Heed the oracle's words, for only his clues can lead you to riches and a safe return.
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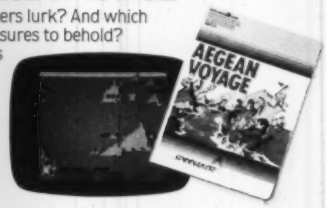

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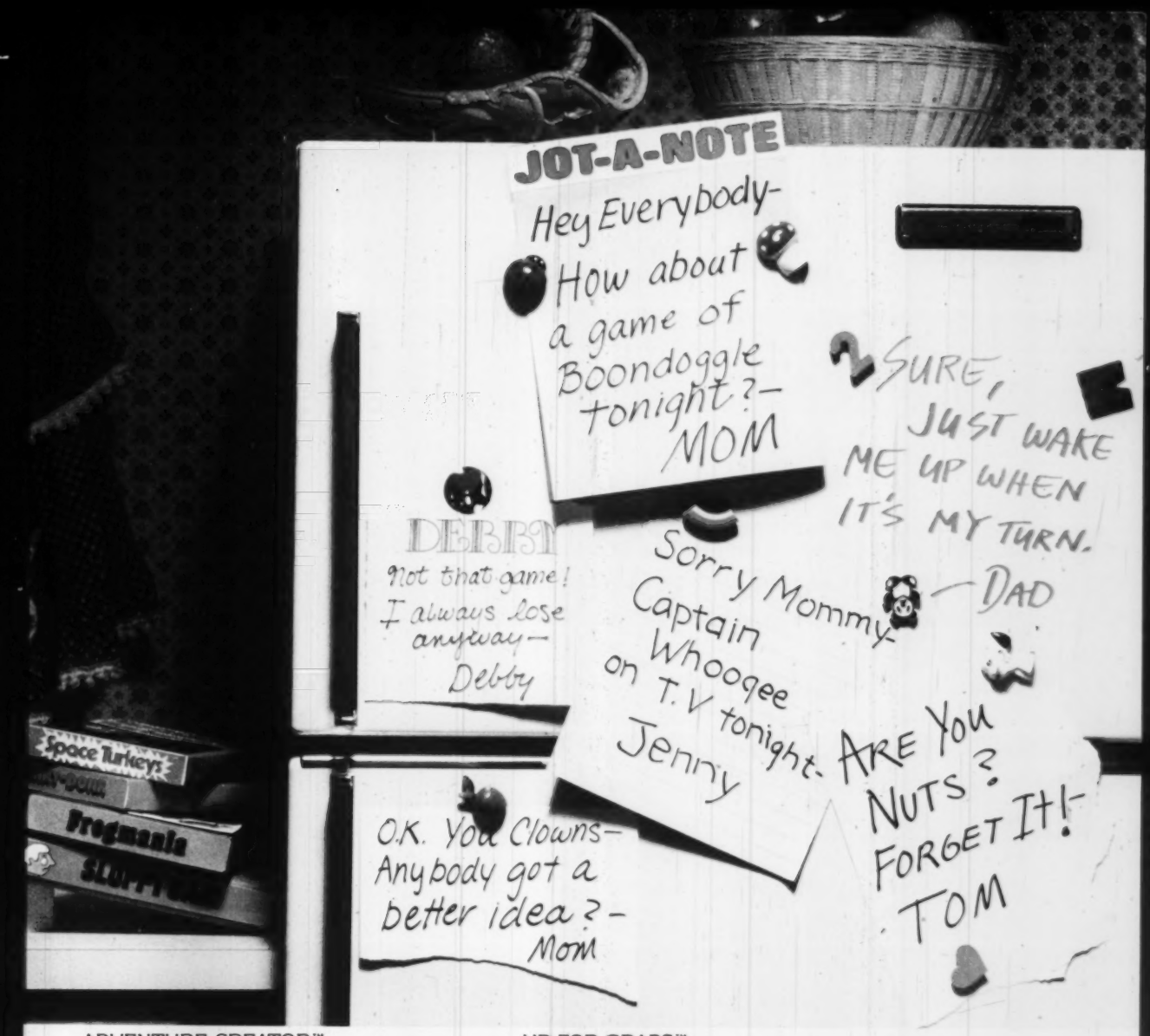

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It's a wildly exciting crossword game where everyone has to think fast. More words will help you win – but don't get caught with left-over letters!
Ages 8 - Adult.

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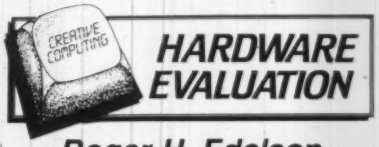
Epson QX-10

The Friendliest Computer Around



HARDWARE EVALUATION

Roger H. Edelson

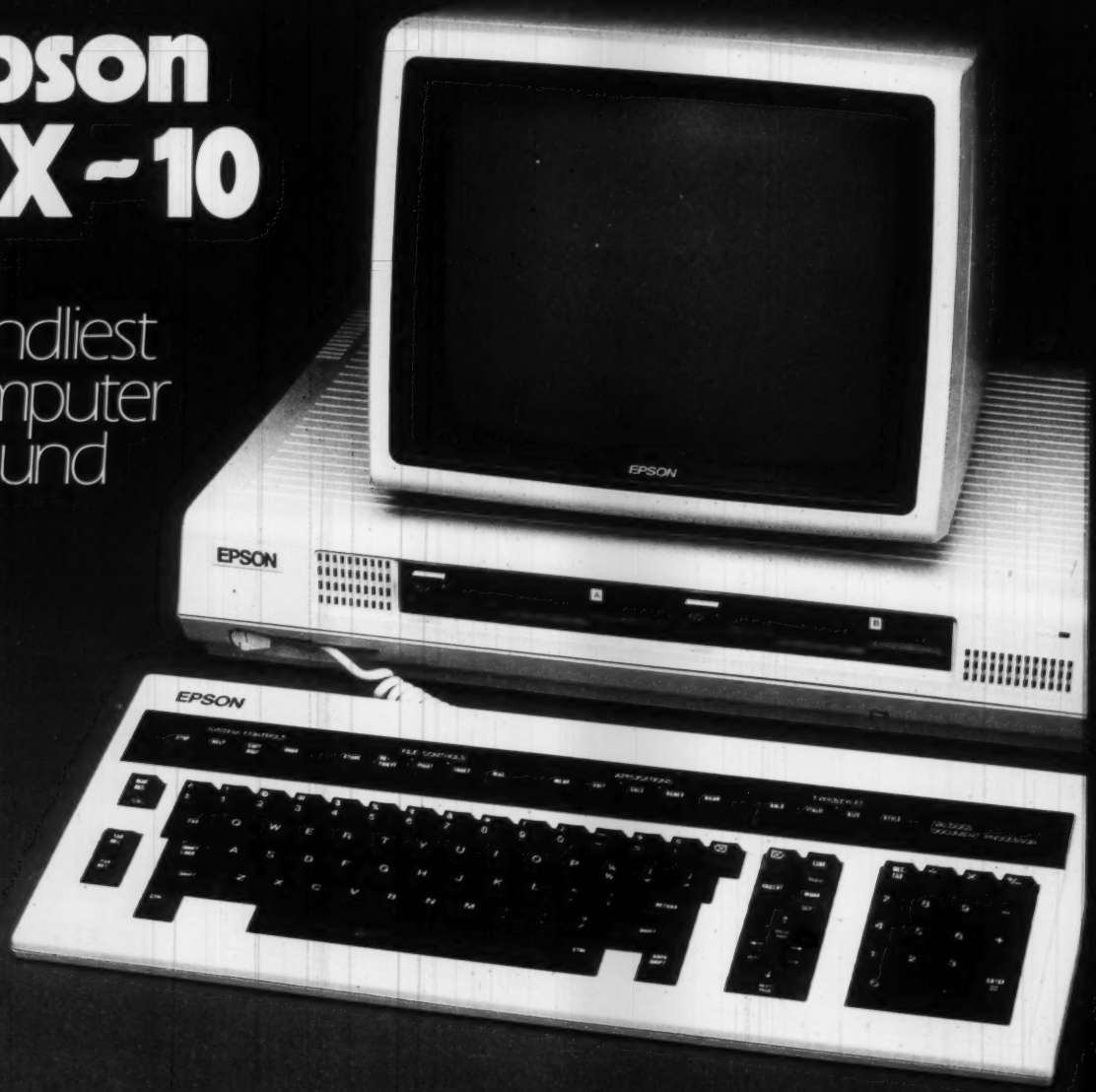
The Epson QX-10 and the Valdocs operating system represent an ambitious attempt to produce a new generation of truly user-friendly microcomputer systems. Because of this bold new direction, the system deserves to be evaluated from two different points of view: as a stand-alone microcomputer and as the first step in the evolutionary progress toward a jargon free, user-friendly ergonomically designed microcomputer.

This review covers the standard QX-10 with two disk drives, the HASCI (for Human Applications Standard Computer Interface) keyboard, and Valdocs version 1.18. This version of the Valdocs (short for Valuable Documents) may represent the last issue of version 1.x software and is both an improvement over, and a cleanup of, earlier releases.

There remain some problems with Valdocs at this point (mainly in response speed), but remember that before you can run you must walk. Actually, version 1.18 is probably more akin to a baby's crawl; and according to Chris Rutkowski of Rising Star Industries, the proud parents of Valdocs, 1.18 ends the crawling period.

Version 2.x will signal a new phase of greatly improved capability and speed, and version 3.x will put it all together, add the few missing business application modules, and really run—we'll see.

While most of the innovative design on the QX-10 has been poured into the Valdocs operating system and its supporting HASCI keyboard, the hardware design is also well thought out.



The computer is divided into three attractive light cream colored packages: the main electronics unit, the 12" (diagonal) monitor, and the detachable keyboard. Charcoal coloring has been used for the disk drives, the insert surrounding the CRT, and the keys to provide an interesting and eye appealing contrast. The total system weighs in at just under 40 pounds.

The System Unit

The heart of the QX-10 is the electronics package or main system unit which houses the two thin (1.5" high) disk drives, the Z80A CPU, a speaker, memory (RAM, ROM, and battery backed-up CMOS RAM), and the I/O. This unit is just a little over 4" high and occupies a 20" wide by 13.6" deep footprint, which is not overly large given its formidable capability.

Most of the innovative design on the QX-10 has been poured into the Valdocs operating system and its supporting HASCI keyboard.

The disk drives are somewhat unique in that they are made by Epson and employ a voice-coil linear actuator for the head positioning, rather than the familiar stepper motor technology. This actuator design, usually found only on hard disk drives, provides fast track-to-track stepping speeds and is extremely quiet during operation. In fact, the noise of the drive is almost entirely masked by the noise of the small muffin cooling fan.

This fan represents what might well be the only mistake that Epson made in their hardware design. The diminished height of the main unit requires a very small fan which must turn at a high (and noisy) RPM to move the air. Even worse, the fan blows the air directly out of the unit. With this arrangement, room air (along with all its contaminants) is sucked into the machine through every opening in the case, including the disk drive slots. A much better design draws the air into the fan through a filter then disperses it throughout the electronics and power supply areas and finally forces it out of the case through the drives and outlets. This flow pattern limits the amount of trapped grit, dust, and dirt on the disks.

The design Epson has chosen for the disk insertion and removal operation is also different, but it has a nice positive action which I like. The disk is inserted as in all drives, but once it is fully seated in the unit a small latch clicks into place, holding it firmly; there is no drive door and no possibility of closing the door and crunching an improperly inserted disk. Next, the small button on the upper left front of the drive must be pressed firmly to inform the drive, and the system, that the disk is in place.

This button is also used to remove the disk. It is designed as a mechanical toggle, and a second push performs this operation. The Valdocs system waits ever so patiently until the system disk has been inserted in the left drive, displaying a message to INSERT DISKETTE.

The system also notifies the operator if the data disk has not been inserted into the righthand drive; it really is user-friendly. The machine performs a self-test when you turn it on, and checks the printer—at the same time. It will inform you if the printer is not connected, if it is out of paper, or if the I/O interface is not correct. Mine complained for weeks, until I finally located a missing wire in the extension cable I had added. (It was not Epson's fault; the cable manufacturer had left out one handshaking signal line.)

The Z80A CPU operates at a moderate 4MHz clock rate, but it is able to access a remarkable (for an 8-bit machine) 256K of RAM under Valdocs (only 64K in the CP/M version), 2K of CMOS RAM supported by a backup battery, and up to 8K of ROM housing the basic boot routines. This ability to use more than the 64K of memory, which is normally the maximum for an 8-bit machine, somewhat negates the main advantage of the newer 8/16 machines, since the faster computational speed of the latter chips has not proved a major factor.

Actually, the main unit of the QX-10 has even more memory than is available to the Z80A. There is another 32K to 128K of dedicated memory supporting the bit-mapped video monitor. The overall design represents a well thought out, fully mature implementation of an 8-bit microcomputer system, and the availability of CP/M 2.2x as an alternate operating system assures a large base of available software.

The overall design represents a well thought out, fully mature implementation of an 8-bit microcomputer system.

The Display

The display is an easy-on-the-eyes, high-persistence, monochrome green phosphor monitor, which provides a moderate- to high-resolution 640 x 400 pixel display. The CRT uses an etched faceplate to reduce the reflected glare of ambient lighting, but no provision has been made to adjust the viewing angle—a minor irritation.

The display is pleasantly clear and

HARDWARE PROFILE

Name: Epson QX-10 with Valdocs and HASCI

Type: Medium to high end business system

CPU: 8-bit Z-80A; 4 MHz

RAM: 64K to 256K RAM; 8K ROM; 2K RAM, battery supported

Keyboard: 104 Keys, full-stroke, non programmable HASCI, or programmable ASCII architecture

Text Resolution: 80 x 25

Graphics Resolution: 640 x 400 pixels

Color/Sound: Monochrome green; speaker controlled by timer

Ports: Parallel, Centronics-compatible; serial, RS-232C

Dimensions: CPU 20.3" x 13.6" x 4.1"; Monitor 12.4" x 13.6" x 10.6"; Keyboard 20" x 8.9" x 1.9"

Documentation: Manuals are average, operating system contains self-help.

Price: $2995 with dual, double-density 5.25" drives.

Summary: A mature design of an 8-bit machine with an innovative and extremely user-friendly operating system and supporting keyboard.

Manufacturer:
Epson America, Inc.
3415 Kashiwa St.
Torrance, CA 90505

readable, and in the text processing mode provides an 80-column by 25-line display. The last line is used for status information such as the line spacing, page number, line number, character position, and the time (kept current by a battery powered clock calendar).

The only feature of the monitor which takes a little getting used to is the length of the phosphor persistence. The characters take somewhat longer than normal to fade out and move.

The Keyboard

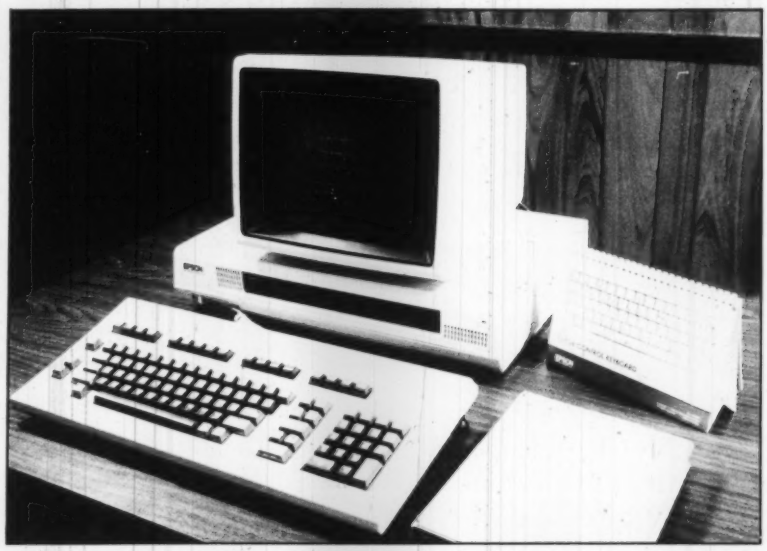
The keyboard is unconditionally excellent; it ranks with the best units I have handled in terms of stroke, feel, appearance, and arrangement, and the HASCI architecture makes operating the Valdocs system both logical and easy. Another version of the keyboard, a standard ASCII arangement, is also available for users who want just a Z80A CP/M system.

The two-color keys (charcoal and dark grey) are divided into four functional groups, consisting of a collection of 61 standard text keys, a separate numeric pad (including the four calculation keys, a separate ENTER key, and even a decimal tab key), an editing and cursor movement group, and the Valdocs specific function keys, which are arrayed along the top. Epson really designed this layout well; too many other computers skimp on the keys making the numeric pad to do double duty as the cursor movement keys. This shared key arrangement greatly slows down data entry when using a spreadsheet program, but that is not the case with the separate functions of the QX-10. Even with the extra keys, the keyboard is not unwieldy. It is the same width as the main unit (20″), less than 2″ high, and only 9″ deep. It rests comfortably on either desk or lap, weighing in at 5.5 pounds.

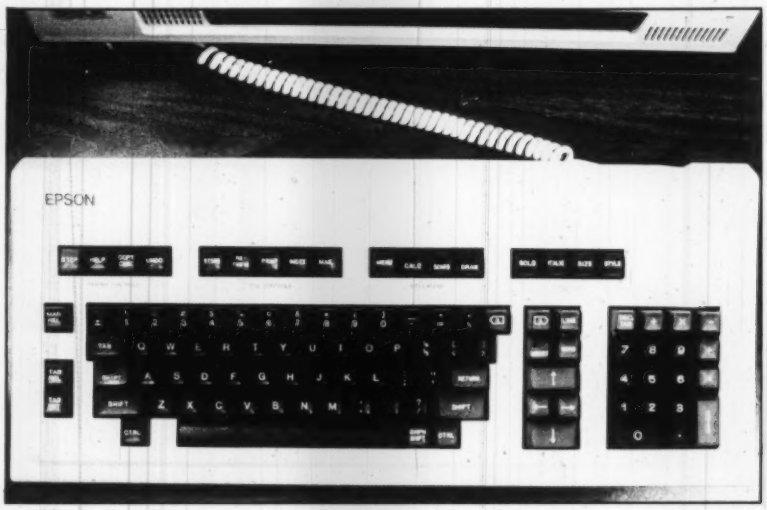
The real difference between the HASCI keyboard architecture and other computers is embodied in the 17 specialized Valdocs control keys.

Speaking of fast data entry, Epson forgot the little bump in the center of the 5 key, a feature which makes data entry considerably faster and easier. The detachable keyboard is connected by a coiled cord and a DIN type plug equipped with a convenient lever that folds out to make removal easy. Using simple plastic adjustable legs, the tilt of the keyboard can be varied to suit the desire of the user. The key tops are sculpted, and have a matte finish. Five of the keys (SHIFT-LOCK, INSERT, CALC, SCHED, and DRAW) have internal LED status indicators.

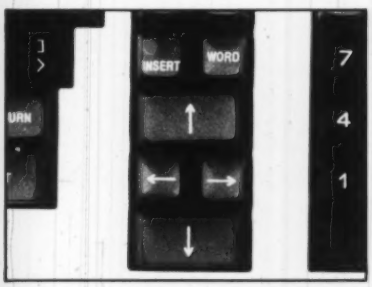
But the real difference between the HASCI keyboard architecture and other computers is embodied in the 17 specialized Valdocs control keys, which are divided into four logical groupings. The first four keys on the far left are labelled



Epson QX-10 system, manual, and small easel (shows meaning of keyboard for various software systems).

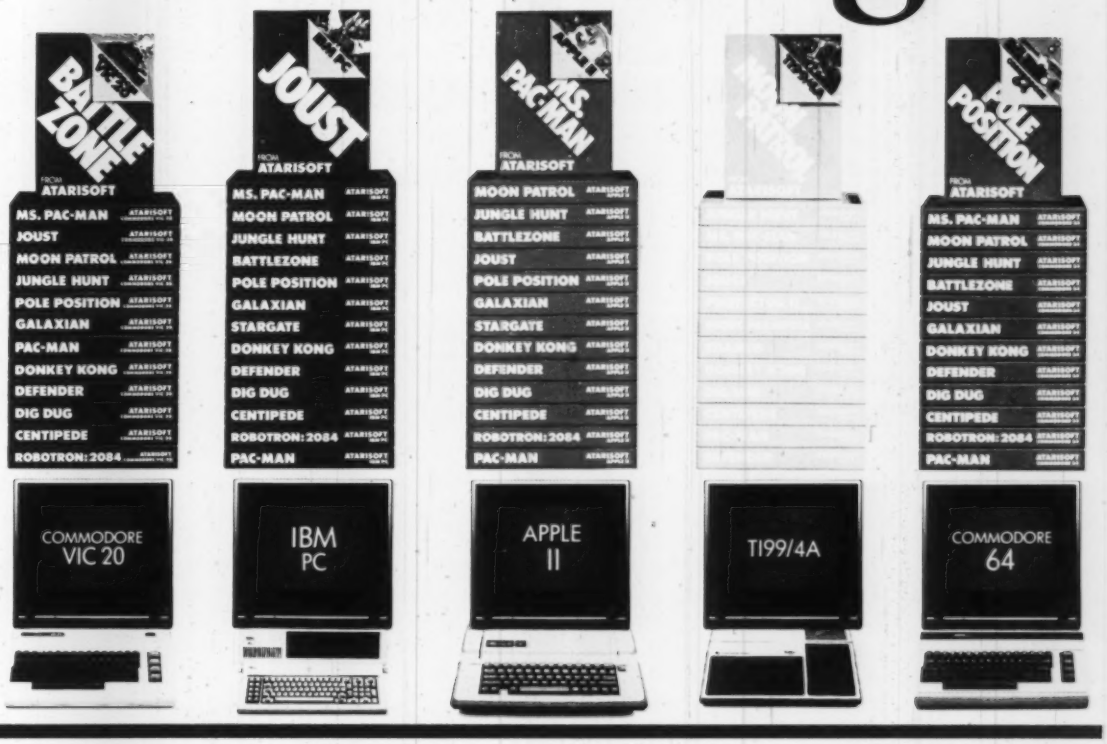


Epson QX-10 keyboard is divided into logical clusters of keys.



Cursor keys are arranged in logical pattern. LED on INSERT key shows when it is "on."

All the hits your computer is missing.



If you thought you'd never find fun games for your hardworking home computer, happy days are here. Because now ATARISOFT™ has all the great hits…Pac-Man,[1] Donkey Kong[2] by Nintendo,[2] Centipede,™ Defender,[3] Joust,[3] Jungle Hunt,[4] Moon Patrol,[3] Pole Position,[5] Galaxian,[1] Ms. Pac-Man,[1] and Battlezone.™

And we've got them for all the hit computers …Apple, IBM, Commodore 64, Vic-20, Colecovision,* and TI 99/4A. We've got Pac-Man, Centipede and Defender for Intellivision too.

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ATARISOFT.™

All the hits your computer is missing.

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CIRCLE 107 ON READER SERVICE CARD

System Controls and control the HELP, COPY-DISK, and UNDO functions, plus a bright red STOP key. The STOP and UNDO keys are real error correctors; STOP halts whatever operation the QX-10 is currently pursuing, and UNDO allows you to reverse the last specified command. Oh, how many times I have wished for a key like this after deleting the wrong file under CP/M. Unfortunately, this is one operation the UNDO key does not provide, but the file handling routines force a second positive response from the operator before a chosen file can be erased.

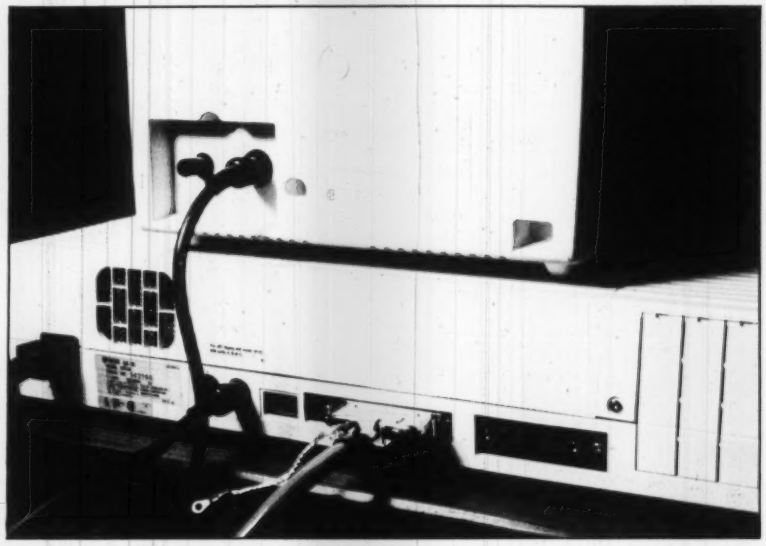
The STOP key turns out to be more useful than expected. Because of the slow response time of Valdocs during some operations and the large type-ahead buffer (32 characters), it is possible to stack up a series of identical commands, such as view next page or retry disk access. The result is a very long wait while the computer patiently retries the operation over and over and over again. This is where the STOP key earns its keep: one press and the operation ceases at the end of the currently executing command and the buffer is cleared.

HELP and COPY-DISK are time savers; in particular it is almost magical to have a single button that automatically makes a backup copy of a disk. It takes a few minutes to do the job, and you still have to swap disks, but compare this with the CP/M operation, which requires exiting the program, calling up the copy program, and changing the disk.

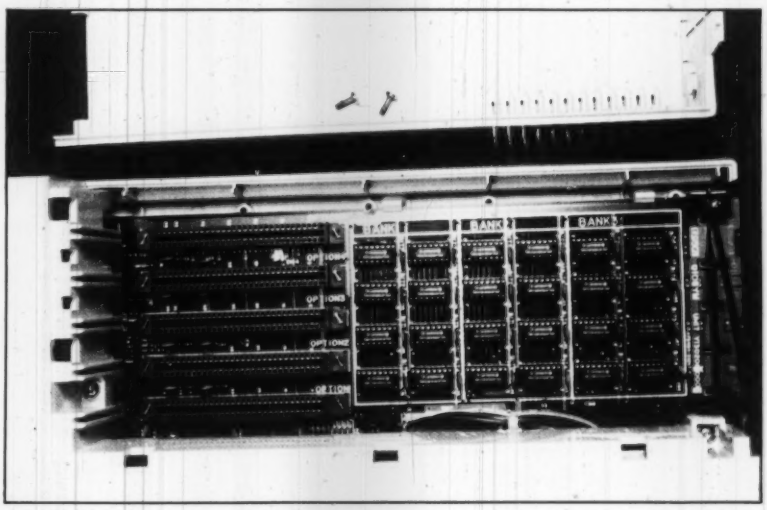
It is easy to use English for file names and provide enough information to allow the establishment of simple relations between different files.

File Handling

The next group of keys (STORE, RETRIEVE, PRINT, INDEX, and MAIL) are the File Control functions, which provide a single-key implementation of the most commonly used file handling operations. With STORE and RETRIEVE, files are placed on, or removed from, disk storage. PRINT and MAIL send files either to a printer or to other systems via electronic mail. It is true that Valdocs 1.18 does not support a true save function with the store command, but the newer versions are expected to implement this function.



Rear of the system unit has connectors for parallel printer, RS-232 device, monitor, and AC power cord.



QX-10 has five slots for add-on boards.

Among the most impressive features of HASCI and Valdocs in the file handling department are the INDEX key and the operation it commands. Instead of the limited eight-letter name and three-letter extension for files allowed by CP/M (i.e., FILEFOO1.ROG), in the 1.18 version of Valdocs every file (graph, document, database) may be indexed by a description of up to 16 keywords. That's right 16 words, and the index function ignores what Valdocs refers to as noise words—I, or, and, it, etc.

With this power it is easy to use English for file names and provide enough information to allow the establishment of simple relations between different files. This function offers the power of a mini-database in a single key at the slight cost of increased time for file handling operations. For example, all my articles for *Creative Computing* can be found by indexing on those words or I can search for all articles or files on peripherals or printers.

Miscellaneous Applications

Most of us use our computers for more than one application. While I mainly use mine for text processing, there are times when I need graphics capability or want to schedule my

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CIRCLE 127 ON READER SERVICE CARD

appointments and meetings. With most operating systems, to change from one task to another requires saving the work currently in progress, exiting the present program, entering the new program, and loading the correct file. Only then can the new task begin.

With the common sense, user-friendly approach of Valdocs and HASCI, the operator simply presses one key to change tasks. While Valdocs comes up in the word processing mode, all one has to do to change applications is select from the application keys, MENU, CALC, SCHED, or DRAW.

CALC turns the computer into a four-function calculator which can place numbers in the text or total a row or column of figures which already exist in the document.

SCHED provides a time management function, and DRAW offers a powerful graphic capability. Each time you change applications, Valdocs automatically saves the work which was in progress.

Word Processing

The QX-10 word processor works on visual and actual pages. The visual page consists of the 60 characters by 24 lines displayed on the screen, while the actual page is the 55 lines of text which will be printed. A horizontal line marks the actual page break on the screen, and a status display is always present.

The status display shows the visual page, lefthand margin, line spacing, current actual page number, current line number and character (cursor) position on that line, Replace or Insert mode, tab settings, righthand margin, time of day, and a vertical righthand flag line which indicates the applicable line codes, such as carriage return, word wrap, characters past the margin setting, etc.

All the normal facilities you would expect in a word processor are available in Valdocs.

All of the normal variables may be set by calling up one of the various editing menus and inserting new values. No other "work windows" are displayed during normal editing. Files may be merged, for example, to place a letterhead file at the beginning of a form letter held in another file.

All the normal facilities you would expect in a word processor are available in Valdocs, including justification, block moves, reformatting, insertion, and search and replace. With just the word processor and calculator it is possible to create spreadsheets and other business related forms.

Valdocs also offers a spooling facility which will queue up to three documents to be printed, releasing the CPU for other tasks.

With the QX-10 in the text processing mode, the final group of keys (BOLD, ITALIC, SIZE, and STYLE) take effect, providing a true what-you-see-is-what-you-get document presentation. The QX-10 uses its bit-mapped graphics capability to display italics, bold, and underlined text. Under version 1.18 the STYLE key provides underlined letters and the SIZE key allows the display (and the printed output) to vary the line spacing selection for one, two, or three lines.

To some degree, it is this graphic depiction of text that slows down the word processing function—perhaps the loudest complaint lodged against Valdocs. Notice that I didn't say the QX-10; under CP/M, running other word processing software, the computer is as fast as most 8-bit machines.

Improvements in Valdocs

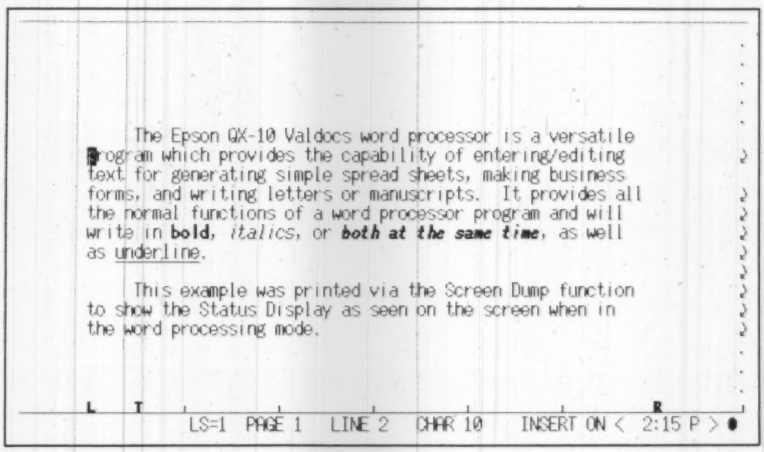
Rising Star Industries recognizes this complaint and has attacked the problem in several ways. First, version 1.18 has corrected some of the imperfections and bugs in the earlier software: the menus have been greatly refined and improved; a repeating vertical cursor control has been added; the text processor now automatically comes up in replace mode rather than in insertion mode; the STYLE and SIZE keys are now partially implemented (as mentioned earlier); and additional printer support is now provided. The so called "open manhole covers" through which data and files dropped from sight have been closed; I couldn't get the system to lose any of my files. The speed of operation has been significantly improved, but it still seems maddeningly slow in many cases.

During certain operations, this slowness is really operator perception rather than actual measured timing. The file handling operations appear to respond slower than equivalent CP/M procedures because CP/M keeps the user involved in the operation by forcing the entry of different commands throughout the process, while all Valdocs requires is a single keystroke. In addition, the speed increase of version 1.18 is effective only

Quarterly Expenses 1983

	January	February	March	Quarter Sub Total
Magazines	$40.50	$0.00	$17.50	$58.00
Postage	15.00	17.20	43.00	75.20
Telephone	1.75	.45	3.85	6.05
Office Supplies	23.00	5.75	43.91	72.66
Mileage (20.5.)	10.25	6.80	37.89	54.94
Electricity (10%)	14.20	13.21	15.67	33.08
Rent (10%)	51.50	51.50	51.50	144.50
Printing	0.00	0.00	34.35	34.35
Advertising	0.00	15.75	43.75	59.50
Misc. Materials	13.98	3.73	17.77	35.48
Monthly Sub Total	$170.18	$113.94	$309.19	
Quarterly Total				$567.71

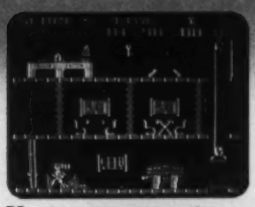
Use of Valdocs word processor with the CALC function.


The Epson QX-10 Valdocs word processor is a versatile program which provides the capability of entering/editing text, for generating simple spread sheets, making business forms, and writing letters or manuscripts. It provides all the normal functions of a word processor program and will write in bold, italics, or both at the same time, as well as underline.
This example was printed via the Screen Dump function to show the Status Display as seen on the screen when in the word processing mode.
L T R
LS=1 PAGE 1 LINE 2 CHAR 10 INSERT ON < 2:15 P >

Figures by F. D. Williams

Valdocs software provides a Document Window and Status Display for data entering/editing.

The world's fate is in your hands.



Picture yourself as the world's greatest super-agent, Graham Crackers. You must go undercover and sneak into an enormous art museum. Incredibly, it's a front for an international terrorist organization!

Your secret mission is to heist all the artwork in search of a classified microfilm. If you don't carry it off in time, the world is doomed!

Grab the keys to the 90 fiendishly boobytrapped rooms (144 in Apple). Brave the multitude of heart-stopping dangers as you make your tortuous way through the deadly rooms. Test your cunning against overwhelming odds!

Chilling suspense and unknown terrors await you behind every door. You must evade man-eating robots, monstrous stompers, sweeper drones and tons of falling boxes — and make death-defying leaps from moving platforms.

Only your artful handling of this dangerous assignment can save the world from destruction!

For Apple II & IIe, IBM PC & jr, Atari, Commodore 64, ColecoVision & Adam.

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when operating under Valdocs. There is no change in the *Creative Computing* benchmark values because Basic runs outside of Valdocs under CP/M.

Version 1.18 has expanded the capabilities of the earlier releases in many of the applications and file handling areas, thus making the system easier to use. For instance, the INDEX feature was limited to eight words per file, rather than the two-line, 16-keyword titles available in the current version.

Rising Star has also given the Valdocs user the ability to modify the text processor both to speed up its operation and to change certain of its characteristics. It is now possible to change the text mode so the cursor is not locked in the center of the screen with the text moving past it. The cursor can appear, instead, in the upper left corner and move through the text—a technique I prefer.

Further, by changing the Valdocs experience level from the lowest level (there are four levels: Beginner, Novice, Advanced, and Expert), you can access the Quirk function which allows the modification of the text screen to a character-oriented, as opposed to graphics-oriented, display. In this mode, the text processor is significantly faster, but is no longer capable of displaying the bold, italic, and other graphic styles. The characters are still printed as commanded, but they are not displayed on the screen.

One change in Valdocs 1.18 that is not

You can sit down at the QX-10, turn it on and immediately produce either a text document or excellent graphs without reading a single instruction.

an improvement becomes evident when you select the PRINT function. The number of lines left blank at the top and bottom of a printed page must be set in the printer parameter file using SETUP.SYS. But even*when this value is set to 0, the printer supplies several linefeeds before printing. This is particularly bothersome when using single sheet paper.

Valdocs a Success?

The operation, success, and problems of Valdocs must be viewed from the perspective of the attempt to create an entirely new synthesis between the computer and the user. Rising Star Industries intended to produce a user-friendly computer system supported by a logically designed dedicated keyboard, which can be used immediately by even complete computer neophytes without reference to the operating manuals. I think they have succeeded. Okay, a beginner will need to read the first chapter of the QX-10 Operations Manual to make sure the computer is correctly unpacked and connected and to learn which drive takes the operating system disk and which is for the data disk.

A first time computer user should read the simple first chapter to avoid some of the really dumb things that have been done: like stripping the outer jacket off the disks (after all, it is obvious that a square object can't rotate correctly, isn't it) or taking the disks to the photocopier to make backups.

Aside from this very preliminary education, there is almost no need for the manuals. You can sit down at the QX-10, turn it on and immediately produce either a text document or excellent graphs without reading a single instruction. Your operation may not be as efficient as possible, but it will be effective and catastrophe free. The philosophy of design as expressed by Chris Rutkowski is, "that which is not specifically prohibited is allowed," as opposed to most other computers which are based on the converse, "that which is not expressively allowed, is probably prohibited."

Version 2.x of Valdocs is intended to take an operating system which was essentially a proof of design offering and turn it into a system which minimizes some of the compromises involved in the first implementation. It is based on the first thorough investigation of a user-friendly operating system.

In this next generation, in place of separate software modules, will be a package written as an integrated entirety, with consequent increased operating speeds. According to Rising Star, almost the entire Valdocs operating system has been rewritten; something less than 10% of the code from version 1.x has been retained. The HASCI interface is portable, so users will probably barely notice the difference in generations.

There is also a strong movement at Rising Star to ship version 2.x without any manuals at all, since the company thinks that many people are threatened by the manuals and documentation shipped with some systems. The new user thinks "Oh my gosh, does this mean I can't use this thing without reading 500 pages of computerese? As I have attemped to make clear, this is definitely not the case with Valdocs; as mentioned earlier, even with version 1.18 a new operator can begin efficiently using the machine minutes after unpacking it.

The final stage (at least as now planned) in the evolutionary progress of Valdocs will be version 3.x, which will contain 95% of all applications software required of a business computer. Spreadsheet, database, and sorting capabilities will be added to complete the package.

All of these applications (and more) are available from the QX-10 under CP/M, but without the user-friendly overmind of Valdocs. If Rising Star and Epson can complete this ambitious undertaking, the QX-10 will take its place as the most user-friendly business computer on the market. ■

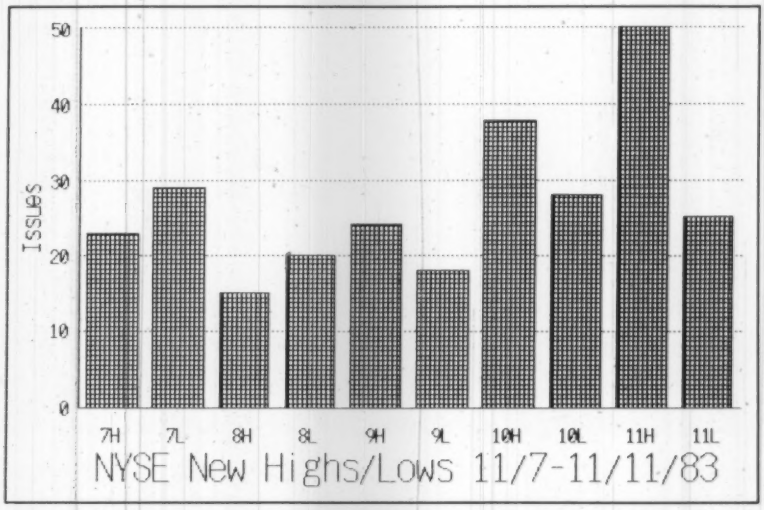

Figure by F. D. Williams

Through an interactive menu, the user may draw pie charts and bar, line, or scientific graphs.

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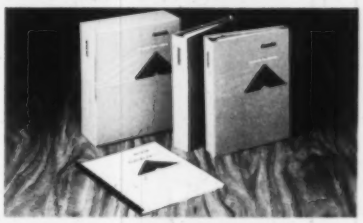

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Introducing Macintosh. What makes it tick. And talk.

Well, to begin with, 110 volts of alternating current.

Secondly, some of the hottest hardware to come down the pike in the last 3 years.

The garden variety 16-bit 8088 microprocessor.

Macintosh's 32-bit MC68000 microprocessor.

Some hard facts may be in order at this point:

Macintosh's brain is the same blindingly-fast 32-bit microprocessor we gave our other brainchild, the Lisa™ Personal Computer. Far more powerful than the 16-bit 8088 found in current generation computers.

Its heart is the same Lisa Technology of windows, pull-down menus, mouse commands and icons. All of which make that 32-bit power far more useful by making the Macintosh™ Personal Computer far easier to use than current generation computers. In fact, if you can point without hurting yourself, you can use it.

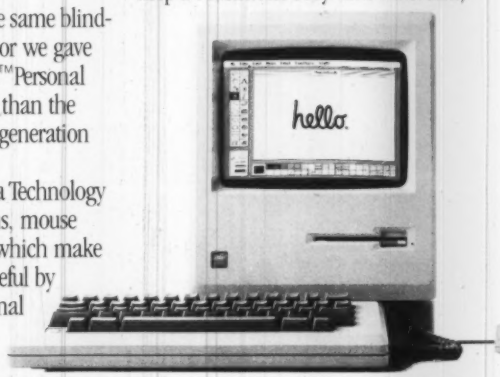
Now for some small talk.

Thanks to its size, if you can't bring the problem to a Macintosh, you can always bring a Macintosh to the problem. (It weighs 9 pounds less than the most popular "portable.")

Another miracle of miniaturization is Macintosh's built-in 3½" drive. Its disks store 400K—more than conventional 5¼" floppies. So while they're big enough to hold a desk full of work, they're small enough to fit in a shirt pocket. And, they're totally encased in a rigid plastic so they're totally protected.

And talk about programming.

There are already plenty of programs to keep a Macintosh busy. Like MacPaint,™ a program that, for the first time, lets a personal computer produce virtually any image the human hand can create. There's more software on the way from developers like Microsoft,® Lotus,™ and Software Publishing Corp., to mention a few.

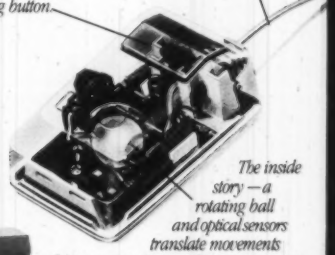


And with Macintosh BASIC, Macintosh Pascal and our Macintosh Toolbox for writing your own mouse-driven programs, you, too, could make big bucks in your spare time.

You can even program Macintosh to talk in other languages, like Yiddish or Serbo-Croation, because it has a built-in polyphonic sound generator capable of producing high quality speech or music.

The Mouse itself. Replaces typed-in computer commands with a form of communication you already understand — pointing.

Some mice have two buttons. Macintosh has one. So it's extremely difficult to push the wrong button.



The inside story — a rotating ball and optical sensors translate movements of the mouse to Macintosh's screen pointer with pin-point accuracy.

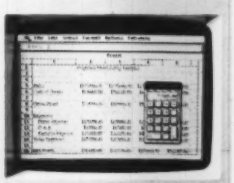
All the right connections.

On the back of the machine, you'll find built-in RS232 and RS422 AppleBus serial communication ports. Which means you can connect printers, modems and other peripherals without adding $150 cards. It also means that Macintosh is ready to hook in to a local area network. (With AppleBus, you will be able to interconnect up to 16 different Apple computers and peripherals.)

Should you wish to double Macintosh's storage with an external disk

Macintosh automatically makes room for your illustrations in the text.

MacPaint produces virtually any image the human hand can create.



Microsoft's Multiplan for Macintosh.

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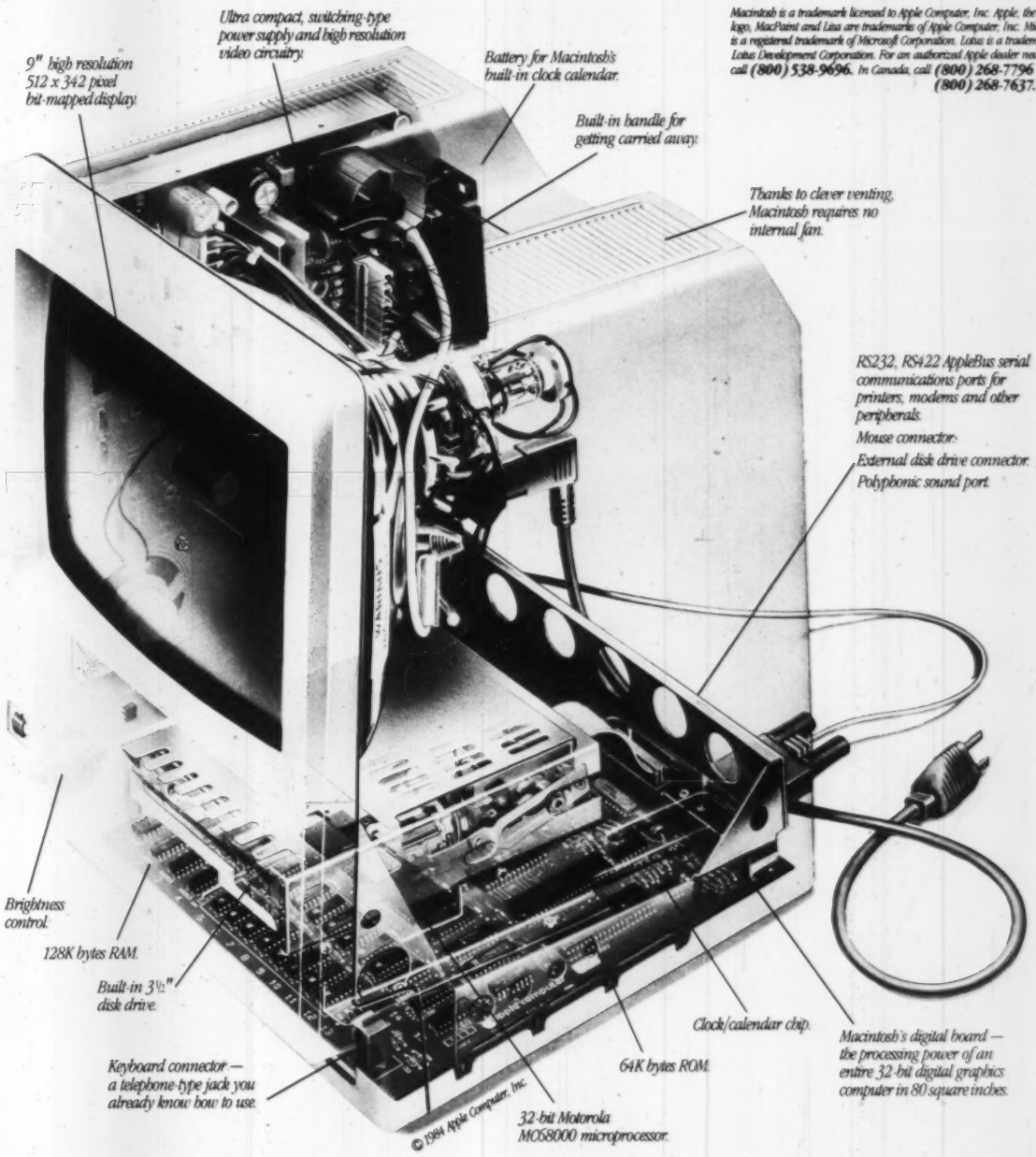

9" high resolution 512 x 342 pixel bit-mapped display.
Ultra compact, switching-type power supply and high resolution video circuitry.
Battery for Macintosh's built-in clock calendar.
Built-in handle for getting carried away.
Thanks to clever venting, Macintosh requires no internal fan.
RS232, RS422 AppleBus serial communications ports for printers, modems and other peripherals.
Mouse connector.
External disk drive connector.
Polyphonic sound port.
Brightness control.
128K bytes RAM.
Built-in 3½" disk drive.
Keyboard connector — a telephone-type jack you already know how to use.
© 1984 Apple Computer, Inc.
32-bit Motorola MC68000 microprocessor.
64K bytes ROM.
Clock/calendar chip.
Macintosh's digital board — the processing power of an entire 32-bit digital graphics computer in 80 square inches.

drive, you can do so without paying for a disk controller card—that connector's built-in, too.

There's also a built-in connector for Macintosh's mouse, a feature that costs up to $300 on computers that can't even run mouse-controlled software.

One last pointer.

Now that you've seen some of the logic, the technology, the engineering genius and the software wizardry that separates Macintosh from conventional computers, we'd like to point you in the direction of your nearest authorized Apple dealer.

Over 1500 of them are eagerly waiting to put a mouse in your hand. As one point-and-click makes perfectly clear, the real genius of Macintosh isn't its 32-bit Lisa Technology, or its 3½" floppy disks, or its serial ports, or its software, or its polyphonic sound generator.

The real genius is that you don't have to be a genius to use a Macintosh.

You just have to be smart enough to buy one.

Soon there'll be just two kinds of people. Those who use computers. And those who use Apples.

The Corvus Concept and ISYS Integrated Software

Wide Screen Computing

SYSTEM PROFILE

Product: Corvus Concept

Type: Small business computer with networking

CPU: 16-bit 68000

RAM: 128K or 512K

Keyboard: Detached, 89 keys

Text resolution: (switch selectable)
72 rows 91 columns vertical
or 56 rows 120 columns horizontal

Graphics: bit mapped; 458,744 pixels

Documentation: (Too?) many manuals

Price as tested: $10,235
includes 512K system $4995
8" Drive $750
20Mb hard disk $3995
ISYS Software $495

Summary: Excellent system for small networks; terribly inadequate documentation.

Manufacturer:
Corvus Systems
2100 Corvus Dr.
San Jose, CA 95124
(408) 559-7000

HARDWARE EVALUATION

George Blank

Would you like a computer that can network with IBM PCs, Apples, and CP/M computers, sharing files on a hard disk? How about a computer that would easily allow you to develop a spreadsheet, create a three-dimensional graph from the spreadsheet, write explanatory notes on an excellent word processor, and then drop the graph and relevant section of the spreadsheet directly into the middle of the word processing text to be printed? Would it help if the screen could hold more than six times the information normally found on the screen of an IBM PC, Apple II, or TRS-80? If so, you might want to investigate the Corvus Concept.

Calling the Concept a personal computer is stretching a point. While this computer compares favorably as a stand-alone system with the Apple Lisa and the IBM PC XT, it is clearly intended to be used in a network of computers; a network that can include Apple and IBM computers as well as other Concepts.

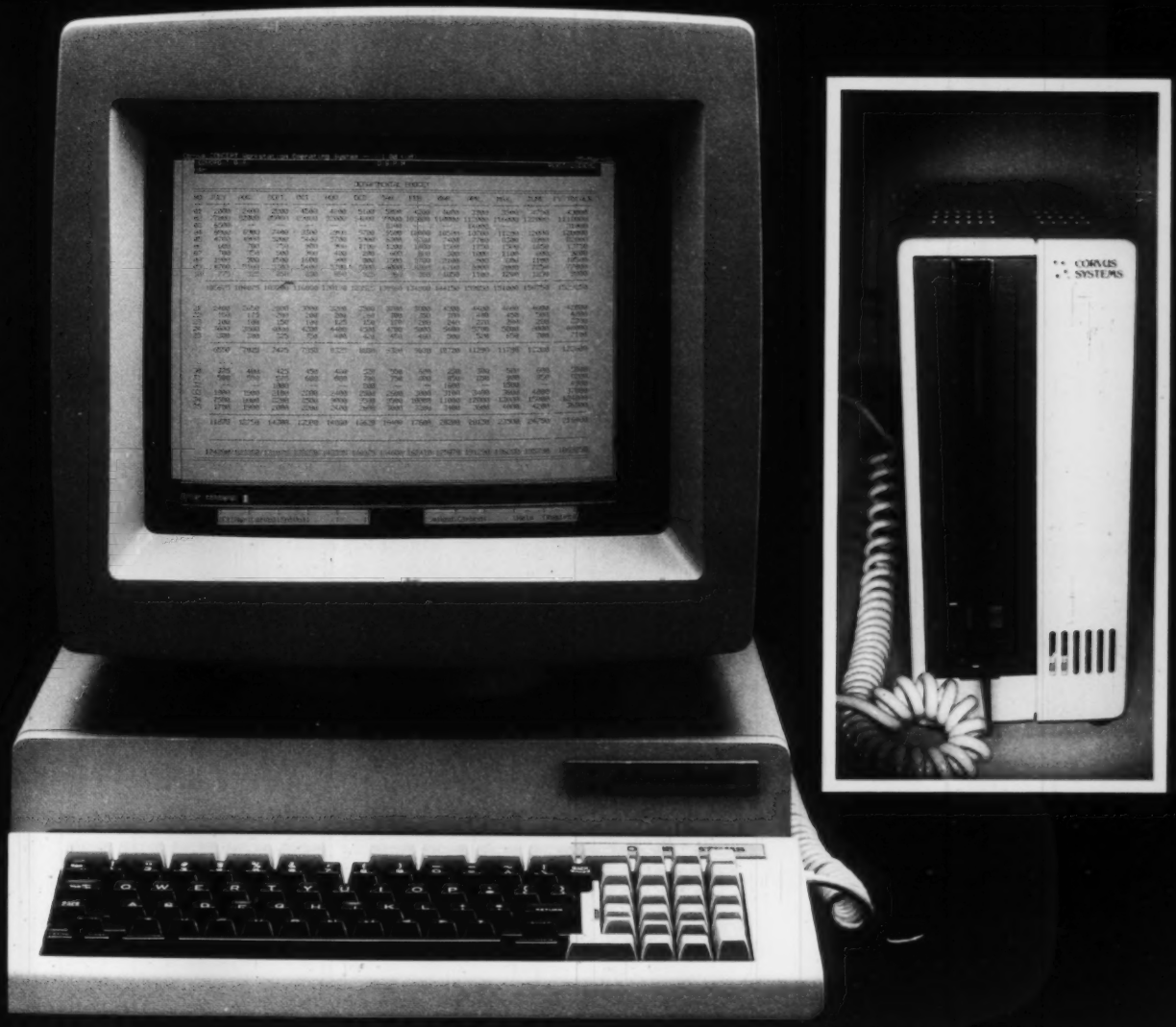
The system is fairly large and covers a full desktop. The monitor mounts on a swivel base on top of the CPU and can be tilted to set the viewing angle. It can be mounted either horizontally or vertically; a switch on the back of the CPU sets the mode. The detached, 89-key keyboard has a coiled cord that allows use anywhere within five feet of the back of the CPU.

I taught an artist to access the system and use the graphics software in ten minutes.

The hard disk drive and 8" floppy drive take up the rest of the desktop, but could be mounted underneath.

This is a very complex system. It takes a long time to set up and even longer to learn to use it effectively. Although the system is provided with enough manuals to stock a library, they are of mediocre quality, and most lack an index. However, Corvus does offer excellent technical support over the telephone. I had to make at least a dozen calls over a two-month period, and was never disappointed with the quality of the help I received.

During the week after Christmas, when the rest of Corvus was on vacation, the telephone support staff was on duty. When I asked a question during that period that no one on duty could answer, they called me back a few hours later with the answer. By waiting until after 5:00 p.m. to call and using Sprint, I kept the total cost of the phone calls to $35—probably reasonable for a $10,000 computer system. (I have had extensive experience with many different computer systems, however, and someone with less experience would prob-



ably have more questions and more difficulty.)

Setting Up the System

After unpacking the system, I spent half an hour browsing through the various manuals trying to figure out what to do first. (Corvus does not provide a Read This First instruction sheet, but they desperately need one.) Finally, I just picked one of the installation guides at random and started with it. By working my way step by step through the Personal Workstation Installation Guide, the Diskette Drive Installation Guide, and the Disk Drive Installation Guide, I managed to get the system set up, but not working. When I could not get past part of the hard drive set up, I called Corvus. They quickly diagnosed my problem as a need to reformat the hard disk drive and talked me through the procedure.

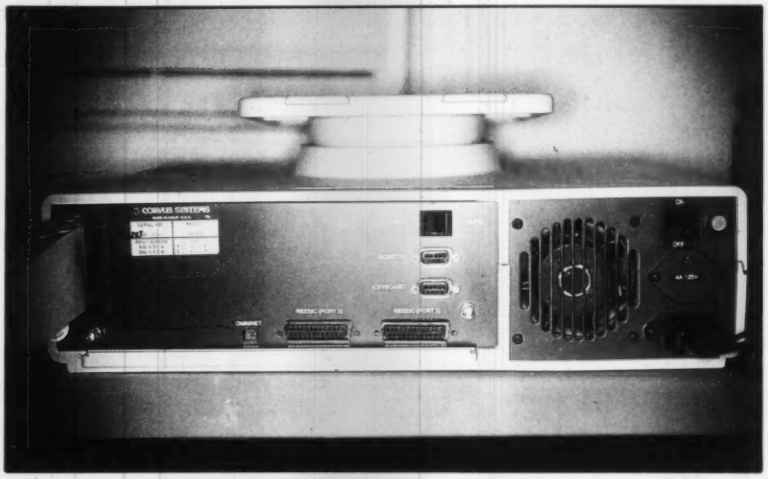
After setting up the system, it is necessary to install the software. This is also a complex process, taking several hours and involving step-by-step instructions in a separate manual for each package. In general, the process involves setting up a area on the hard disk to hold each application, possibly setting up another area of storage for files generated by that application, copying the software to the application area, then deciding which users of the system will have access to each application and setting up the access tables to allow them to do so.

Many of the other tasks involved in using the system are equally complex. This does not mean that the system does not support casual users. I taught an artist to access the system and use the graphics software in ten minutes, and he had not previously operated a computer. But at least one skilled computer operator should be available at each installation to serve as the system manager and handle special problems. Even such a simple operation as copying a file from the hard drive to a floppy disk can involve 15 minutes of searching through manuals and ten or more programming steps.

To use the system, as a casual user you would type your user name, then enter your password. This would bring you to the "dispatcher level" of the operating system. Labels at the bottom of the screen would reference the ten function keys at the top of the keyboard. Probably, you would first press function key 4, labeled SetVol, and type the name of the volume

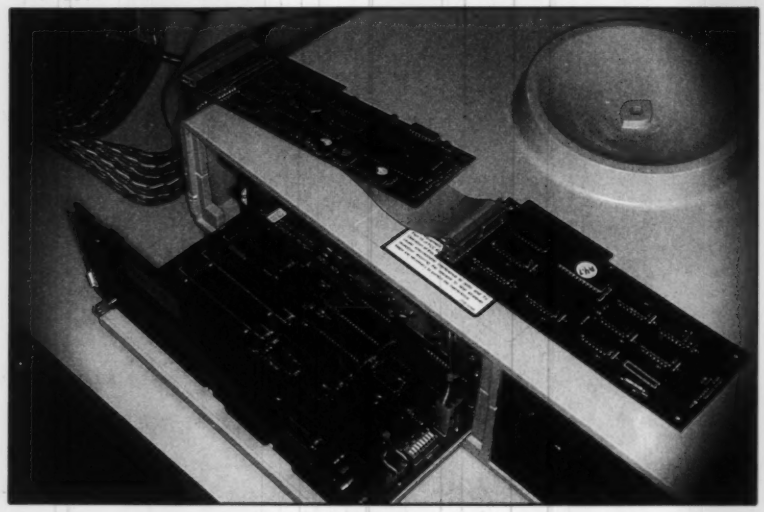
20Mb of disk storage for $3995.

Warmware rather than hardware or software is becoming the major cost in a computer system.



The back panel includes a network port, two serial ports, keyboard and monitor ports, monitor vertical/horizontal switch, power connector and power switch.

A pull out tray has four Apple-type expansion slots. Cards shown here are for the floppy and hard drives.



(hard disk memory storage area) within which you wanted to work. Next you would press the function key appropriate to your application. For example, on my system, function key 1 is the UCSD Pascal programming environment, key 2 is the Logicalc spreadsheet program, key 3 is the ISYS system described later, and shifted function key 3 enters the Edword word processor. Depending on which key is pressed, the appropriate software would load into memory from the hard disk, initialize, and begin to accept your input.

ISYS Integrated Software System

It is necessary for me to stress that I am speaking as a beginner in evaluating the ISYS software. It typically requires at least 60 hours of use to become proficient using any typical business software application, such as a word processing program. ISYS includes several such applications, plus operating environments that are as complex as the applications.

I have used Edword for only about eight hours, Logicalc about 30 hours, and Graph about 20 hours, so I cannot claim to be an expert on any of them. I spent only a brief time looking at the data communications, list management, and file sorting functions of ISYS. The desk tool functions were moderately useful and very easy to learn.

Using the 60-hour average, which seems appropriate from my experience with the system so far, I estimate that it would take 12 weeks of full time use to become a fully qualified system manager of a Concept workstation running the ISYS software, and another four weeks if the system were networking with other computers. This is largely a function of the complexity of the system; if it did a lot less, it would be a lot easier to learn and use. But it does indicate that warmware (a human being, probably collecting a

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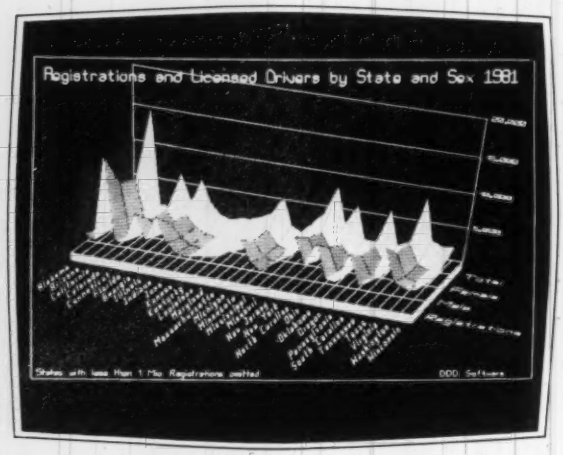
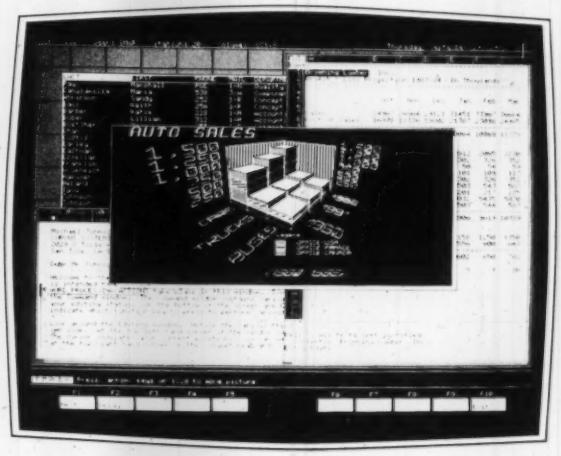


ISYS Graph creates impressive three-dimensional graphs.



ISYS integrates Graph, Logicalc, List Management, and Edword.

good salary) is becoming the major cost in a computer system rather than hardware or software.

The ISYS system environment is menu driven. It works through ten function keys, which (unlike those on the IBM PC) are properly placed along the top row of the keyboard. The bottom three rows of the display typically contain ten inverse-video blocks—one for each function key—with up to two labels for each key and the label F1 through F10 above each block.

Each function key can have four meanings at any single menu level: the regular function, another with the shift key, a function when the command key is also pressed, and a function with both the Shift and Command keys. Pressing the command key by itself displays a second set of function key labels. Above the function keys will usually be a box containing two more lines to receive command input and display messages from the application or system environment. Because the screen is so large, dedicating five lines at the bottom to command and control functions does not appreciably reduce the work space available.

The top of the screen contains a status line, displaying the current operating system, user name, station number, disk volume name, day of the week, date, and time. To set the command areas apart from the work area, the work area is enclosed in a box made from four narrow lines.

The well-labeled function keys make the Corvus Concept, at one and the same time, one of the easiest and one of the most difficult systems I have ever used. If the function I need is displayed on the screen, it is easy to find and use. This is true in most of the applications for most of the commonly used functions. If I have to press the Command key to find the function, I am not quite as satisfied. If I have pressed a function key to go into another menu and then find the function I need, I become exasperated.

Sometimes you have to go through several pages of menus to get to a function, and it is easy to get lost on the way. But worst of all, for many functions in the Corvus, you have to search through several manuals that don't have indexes to find the instructions. Then you have to page through several menus to accomplish preliminary functions. Then you must type relatively meaningless or illogically abbreviated commands without error after accomplishing all of the necessary preliminaries. This is far too much effort to complete what should be a simple task! In general, however, the functions are well thought out. For example, function key 10 is usually dedicated to exiting from the current menu. If this is likely to cause trouble if done at the wrong time, then the shifted F10 key may be required to exit.

Altogether, the program has more than 140 functions, and it is fully integrated with the data communications, spreadsheet, and business graphics in ISYS.

Word Processor

I like the Edword word processor better than any of the more than 20 word processing programs I have used in the past six years. Although it would probably take many hours to become an expert with the system, it takes only a few minutes for a beginner to learn to accomplish most ordinary word processing tasks.

After I created my first sample workspace, without even looking at the Edword manual, a letter from Corvus Systems appeared in the workspace automatically. The letter, which would fill about three single-spaced typewritten pages, was actually an interactive tutorial on Edword. It taught me how to use the function keys, enter and delete text, mark sections of text, cut and paste, and use the undo function. I love having function keys for both undo and redo.

It is a joy to be able to display 72 rows of text on the screen at one time, with 90 characters in each row. At the top of the screen is a ruler with the tab positions indicated for laying out your text. Also listed are the program name, version number, and the name of your file. The screen functions as a moving window, so the document can be wider and much longer than that which could be accommodated on a single screen. On the left edge of the screen is a line which has a thick portion to show the vertical position of the current window in the document and an arrow pointing to the line that holds the cursor.

At the bottom of the screen you find a long open box with the current horizontal position in the workpad shaded solid, the number of the current line, the number of lines in the document, and the column number of the current cursor position. The line below that holds the mode (i.e. Edit) in inverse video, plus any status messages from the program to the user.

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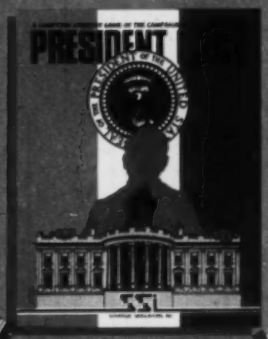

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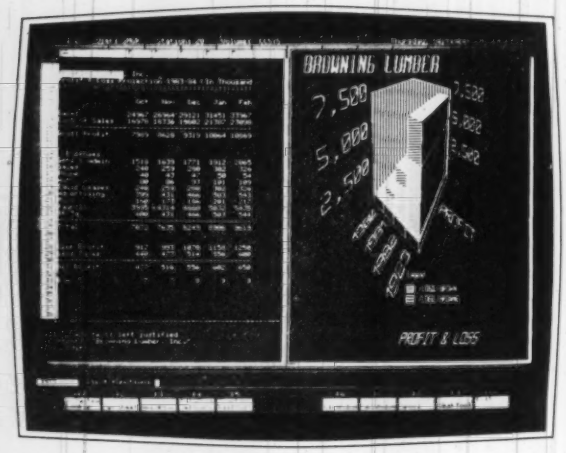

Split screen displays graph made from spreadsheet data.

List, letter, and calculator on one screen.

The function key labels indicate 20 functions on the regular menu, with 12 more on the command menu. Some of the functions invoke a new menu. For example, the Format key displays a new menu with 16 functions, including headers, footers, line spacing, justification, margins, headlines, page breaks, centering, and comments. Altogether, the program has more than 140 functions, and it is fully integrated with the data communications, spreadsheet, and business graphics in ISYS. Edword is included in the price of the Concept, and for some people, may justify the purchase of the computer.

Spreadsheet

The Corvus spreadsheet program, Logicalc, is a powerful application. It is the fourth spreadsheet program I have used seriously. I prefer Logicalc to Microsoft's *Multiplan* and to *VisiCalc*, but, given a choice, I would do my own work on the IBM PC using *Perfect Calc*. The biggest advantage of Logicalc is the increased screen size of the Concept.

I was able to display 12 months of 18 different accounts for my business on the screen at one time, with summaries, titles, and extra lines and blank space on the screen to increase readability. The function keys make the system easy to use in most cases, and I found all the functions that I have come to require in a spreadsheet, including titles displayed over more than one cell, independent column widths, and the ability to lock areas of the spreadsheet.

What I liked least about Logicalc was the inability to exit a newly entered cell with the arrow keys. You must press Enter or Return (the Concept has both keys, with no functional difference!) to exit a cell. If the Advance key is on, this will automatically move you one cell to the right. If you don't want to go right, you must use the arrow keys after pressing Return. I much prefer to eliminate a keystroke and exit the cell with an arrow key.

The lack of an index to the manual or a reference card for Logicalc is a very serious drawback to this system. I had so much trouble searching for information in the manual that I finally gave up and went back to *Perfect Calc*. I found that I was happy to trade a large screen display for ease of use.

ISYS Graph is a fascinating high-resolution business graphics program.

Logicalc can be entered directly from the opening menu of the Concept, called the Dispatcher Level, or through the ISYS menu. If you enter directly, your spreadsheet defaults to 40 rows of 11 columns of 10 characters. From ISYS, only 34 rows of 10 columns of 10 characters are displayed. However, several features are added under ISYS, including an Undo command; table lookup; selective column display; direct line charts, bar charts, or dot graphs (in addition to the ISYS Graph program); and program suspension while another ISYS function is used. Additional functions include a forms mode, user defined functions, and built-in functions for internal rate of return and net present value.

Graph

ISYS Graph is a fascinating high-resolution business graphics program. There are 83 built-in templates for pie charts, bar, line, surface, ribbon, outline, and freeform graphs, and you can modify any of the templates or create your own. It will read several forms of files, including Logicalc files and Edword files, and draw charts from the data.

You can select a three-dimensional graphics template and press a single function key to draw a chart automatically from your data file. You can also use a zoom lens function to set the graph to the size you want, rotate it around the X, Y, or Z axis for the best viewing angle; choose three different shadings for the base and two displayable reference planes; choose a border for the base; choose a text font, printing angle and size for the labels; and move the whole graph to the desired location on the screen, redraw it, save it, move over into Edword, and drop the graph right into the middle of your text.

The system is very powerful and easy to learn and use, but it is limited to producing graphs from data files. If you wanted to use the high-resolution graphics on the Concept for other purposes, Corvus offers another program (not tested) called Corvus Paint, which has 200 commands and uses a mouse, for $395.

ISYS Desk Tool

The ISYS desk tool includes a perpetual calendar that will display any month of any year, and an international clock which shows the time in all world time zones, with one city refererenced in each. Also included are a high-resolution analog clock with moving hands, a stop watch with lap timer, and a calculator that includes trig and log functions and which displays a

moving tape. I haven't figured out a use for the lap timer yet. Perhaps I could look out the window and clock cars on the highway?

List Management

The ISYS List Management program allows you to create files that are collections of records, such as a mailing list made up of multiple fields for title, first name, last name, street address, city, state, zip code, and information fields. Once a template is created for the necessary records, the program can input data, edit, search, and sort a list.

The ISYS Lookup program will search files up to 100,000 characters long. You can selectively search any data field in the list and display it to the screen or save it to a file. You can also use the List program to create a form to merge a list with Edword files for printing form letters or addressing envelopes. Unfortunately, merged fields have fixed lengths, so if you allow 25 characters each for first and last names, Sam Smith will receive a form letter with 22 spaces between his first and last name.

Data Communications

The ISYS Data Communications program is a complete serial communications program. The function keys and menus make it extremely easy to use, and the screen display is one of the most helpful I have ever seen in a communications program. Most of my own file transfer in-house uses the XModem (Christiansen) protocol, which allows automatic file transfer with error checking, so I was happy that this was supported on the Concept.

The program will emulate a VT100 terminal for communication with mainframe computers. The instructions for hooking up to another computer are much better than I have seen with other terminal packages. They include information on pin connections for creating a null modem and settings for the Hayes Smartmodem.

The automatic dialer allows you to maintain a directory containing name, phone number, logon sequence, password sequence, baud rate, word length, and parity for systems you use. The only feature I like in a communications program that is missing is the ability to program individually the output lines and read the input lines (CTS, DSR, etc.), so that I can analyze handshake problems.

Overall Impressions

With the exception of the need to reformat the hard disk drive before setting up the computer, I did not experience any hardware problems in three months of regular but intermittent use. I encountered several software problems, none serious. The most embarrassing one (for Corvus) was that the Set Year function in the system clock absolutely refused to accept 1984 and insisted that it was still 1983. When I tried to use a template in the ISYS Graph program with more than the number of columns and rows recommended for that template, the system locked up and I had to turn it off to regain control. When I blew a circuit breaker by plugging an electric heater into the same circuit as the computer, the system locked me out of the application I was in, telling me it was already in use. Corvus telephone support directed me to the section of the manual that told me how to reset the semaphore table, which prevents two users from accessing a file at the same time, and everything worked fine again.

Although Corvus sent me a CP/M emulator, I was never successful in installing it on the system, probably due to a defective diskette. I lost interest when I found out that it emulated only 8080 instructions, since most of my software contains Z80 specific instructions.

The program will emulate a VT100 terminal for communication with mainframe computers.

On the positive side, I loved the large screen, the excellent, well laid out 89 key keyboard, and the use of the function keys in different applications. I didn't have a printer that could handle it, or I would have really gone overboard with the integrated word processing, graphics, and spreadsheet. Edword seems far better than any other word processor I have used.

Because I couldn't hook up my TRS-80s, my PCjr, or my Seequa Chameleon, and I seldom use my Apple II, the networking did not appeal to me. I hated the operating system, particularly all the extra work that is, unfortunately, necessary to achieve controlled access multi-user systems.

I also hated the manuals. I think the best way to judge any complicated product is to pick up the instruction manual and look through the index. If it doesn't have an index, you may have a serious problem if you buy the product. Of the 15 Corvus manuals that I received with the system, only three had indexes. The Digital Research manual for CP/M and the four Softech Manuals for the UCSD P-System did have indexes.

Despite the 68000 microprocessor, I was not impressed with the speed of the system. I started to run benchmarks, but considered it unfair when I reflected on the increased time required to rewrite the oversize display and the extra overhead required for multiple user access control. I did find the system speed adequate, however, and significantly better than the Apple Lisa, which seemed to spend 20 minutes of each hour displaying an hourglass and the words "Lisa is preparing this window's display."

Using the UCSD Pascal operating system, I did not find any appreciable differences in speed among the Concept, my Seequa Chameleon, and my Apple II Plus. I did not run any number crunching benchmark tests because this system seems unsuited to number crunching applications; the supplied applications are oriented to business, not science, and the UCSD P-System has pathetic accuracy. Using a Pascal adaptation of Dave Ahl's benchmark test—computing 100 square roots, squaring them, and adding the sum of the differences—I received perfect accuracy (.00000000000000) on the Seequa Chameleon with Turbo Pascal, accuracy in the top 5% of the systems tested by *Creative Computing* on the TRS-80 with Pascal 80, and by far the worst accuracy of any of the systems tested on the Corvus using UCSD Pascal. Since Corvus does not currently supply a Basic interpreter, (a Basic compiler is available from Softech Microsystems for $395) and UCSD Pascal (unlike the other Pascals mentioned) lacks random number functions, the actual benchmark could not be run.

Additional Software

Since this computer is obviously aimed at small business users, it is critical to know what other software packages are available. Applied Software Technology offers *Versaform* for the Corvus at $495. This is a powerful and reasonably flexible business forms processor with some database functions. I have been using *Versaform* for two years on the Apple to maintain my company mailing lists.

A.D.I. America offers the *Aladin Plus* relational database manager for $795. *Aladin Plus* allows a million records per file, unlimited key fields, and access to non-keyed information, with special features including summation, protected and comment fields.

Accounting packages are available from Great Plains Software ($500 to $2600), Molten Lava Software ($500 to $2800), and Microfinancial Corp. ($900 to $11,150). Abacus Data supplies five different database management systems for $399 to $1195, including *Informax-20*, a multi-user DBMS. Some of the many packages offered by other suppliers include medical office management, electronic mail, PERT charting, mailing list management, legal client record keeping and billing, statistics, manufacturing analysis, and educational administration software.

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The Corvus Network system would be a good choice for businesses too large for a single microcomputer, but too small to justify a minicomputer system.

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The Concept workstation, as tested, included 512K of memory, 20Mb of hard disk storage, an 8" floppy disk drive, and a monitor which can be mounted vertically to display 72 rows and 91 columns, or horizontally to display 56 rows and 120 columns of text.

List prices for the system are $3995 for a 256K Concept workstation, with monitor and detached keyboard, and $4995 for the 512K workstation. The floppy disk drive is $750 additional, and hard drives range from a 6Mb drive for $2195 to a 20Mb drive for $3995. The operating system and Edword word processor are included in the price. The ISYS integrated spreadsheet, graphing, word processing, and communication software costs $495. If you are networking the system, the necessary cards, cables, and tap boxes cost $495 per workstation (Concept, IBM, or Apple), or $1895 for a four-system Omninet Transporter Package. Separate versions of the 512K Concept workstation that run Unix cost $4295 for the Concept Uniplex that can be expanded to two users and $5995 for the Concept Plus that can service eight users. The Unix versions of the Concept cannot run non-Unix software.

The Corvus Network system would be a good choice for lawyers, doctors, retailers, wholesalers, real estate brokers, small manufacturers, and other small businesses with a need for three to eight workstations—businesses too large for a single microcomputer, but too small to justify a minicomputer system.

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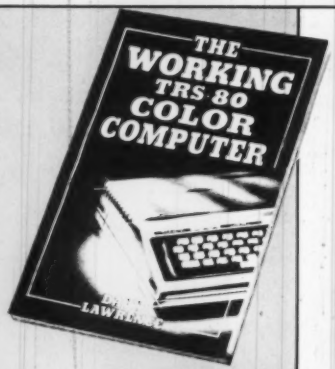

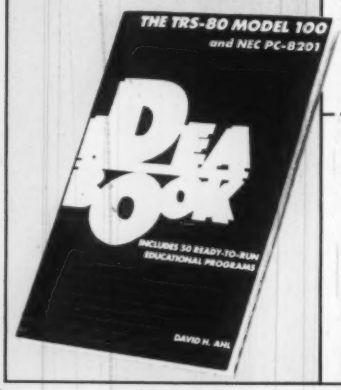

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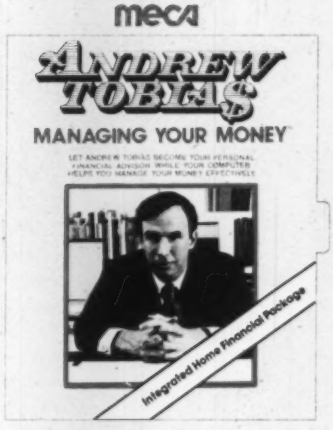
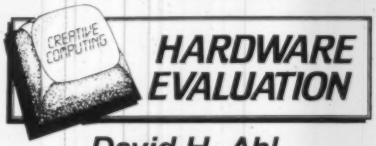


CIRCLE 219 ON READER SERVICE CARD

The Sord Is Mightier Than The Pen

Sord IS-11 Notebook Computer



David H. Ahl

In contrast to the majority of electronics companies in Japan that were either outgrowths of the military buildup for WWII or established shortly after the war to aid in Japan's thrust to achieve technological supremacy, the history of the Sord Computer Corporation reads more like a Horatio Alger story. The company was established in 1970 by Takayoshi Shiina and his mother for the purpose of writing computer software.

Entrepreneurs are rare in the history of Japanese industry, so Sord is regarded as a maverick and does not seem to be under the protective umbrella of Japan, Inc. (or MITI).

As a result of this involvement with computer applications before getting into the manufacture of hardware, the people at Sord appreciated the need for integrated software long before it became a buzzword in the microcomputer industry. And, as a result of being a maverick, Sord understands the need for savvy marketing.

Put this experience together and what do you get? First, the M23 computer which was introduced into the U.S. market at NCC '83 (see *Creative Computing*, August 1983). Rather than a programmer-oriented operating system, the M23 uses PIPS, a no-programming business planning system of integrated software. It has 43 interactive commands such as MT (Make Table), SORT (Sort Data), and CT (Change Title). The system is priced in the $2000 range.

When this system was first introduced in Japan (in 1980), Sord opened a series of PIPS Inns to teach users how to use the system in day or night classes. The system has been well received in Japan and the U.S.; major customers include Japan Air Lines, Citibank, and several other major banks.

Sord also markets the M68, the first desktop computer to use 256K memory chips. This high end 16/32-bit machine uses a 68000 cpu running at 10 MHz and an 8-bit Z80A. The basic machine costs about $5000, while a fully expanded system with 4Mb of internal memory goes for $13,000 plus.

The "Consultant" Notebook Computer

But enough of desktop computers. Sord has now taken its concept of integrated software and shoehorned it into the IS-11 notebook computer, dubbed the "Consultant."

Upon hearing the hardware specifications at the press conference, we weren't particularly impressed. The IS-11 has an 8-bit Z80A operating at 3.4 MHz, 32K of RAM (expandable to 64K), eight-line by 40-character LCD display, parallel and RS-232 interfaces, rechargeable NiCad batteries (eight hours of operation per

charge), built-in microcassette recorder, and 64K of ROM. The last two got our attention, but their full significance did not become apparent until we got our hands on a machine.

The keyboard is virtually identical to the one on the NEC 8201 (and Radio Shack Model 100) both in feel and number of keys (62 full stroke, 8 function). In other words, it is a good, solid keyboard with a sensible layout. On the other hand, we were disappointed that Sord chose to put the cursor control keys in a horizontal line rather than using the more sensible diamond pattern on the NEC 8201.

Text resolution of the LCD display is eight lines of 40 characters. Measuring 1.4" x 5.6", the display is about 26% smaller than the one on the Model 100; nevertheless, it is quite legible. Graphics resolution is 256 x 64 pixels.

In the upper right corner of the case is a built-in microcassette recorder. Data transfer speed is an amazing 2000 baud, considerably faster than the leisurely rate of the Model 100. A C-30 microcassette can store 128K, a respectable number of programs and pieces of data.

Around the periphery of the housing are a number of connectors, removable covers, and sliding panels. In the back is found the power switch, LCD angle adjust control, recessed reset switch, AC adapter connector, bar code reader port, serial (modem) port, RS-232 port, parallel port (for CRT and microfloppy disk), and ROM cartridge socket. On the bottom are panels covering connectors for a thermal graphics printer, external numeric keypad, and additional memory.

The IS-11 is nearly identical in size to a Model 100 (11.8" x 8.4" x 1.4"), but at 4 lb. 6 oz., weighs about 8 ounces more.

The IS-11 is available in the basic configuration for $995 and with a built-in modem for $100 more. Optional peripherals (which won't be available until July) include a 3 1/2" microfloppy disk drive, 40-column thermal printer, bar code reader, numeric keypad with 16 additional function keys, and a Basic language interpreter. Prices on these add-ons have not been set.

Integrated Software

As you might gather from the statement that the unit has 64K of ROM, the IS-11 has a substantial amount of built-in software—and it isn't Basic.

Turn on the machine, and the bottom line of the LCD display shows six "labels" corresponding to the six function keys. They are I-PIPS, I-CALC, I-EDIT, I-COMM, SYSTEM, and HELP.

I-PIPS is a spreadsheet system which keeps data arranged in the usual row and column form. However, I-PIPS has certain features such as searching and the ability to sort data alphabetically that give it the capability of a limited database program as well. Moreover, I-PIPS can automatically draw graphs of data in the worksheet and print them out. Lotus *Symphony*, watch out!

The entire I-PIPS module is menu-driven and is exceptionally easy to use. The menus are organized in layers, with each new layer accessed by a function key. You need not remember any commands (as in most spreadsheet and database packages); instead you use the menu to get to the desired function. However, if this sounds cumbersome (you are the type who likes shorthand commands), you can execute any command directly by simply typing it on the keyboard. Moreover, you can type out the name of the entire command or just the first letter or two.

Upon selecting I-PIPS, you are presented with the choices Table, Edit, Files, Calc, Dbase, and Help. The next level (after pressing Table) takes you down to Create, Write, Title, Show, and Help. If you then press Create, you are presented with a series of questions about the spreadsheet to be created: filename, data type in each column, column width, column title, and number of rows.

From there on, I-PIPS functions very much like a spreadsheet on a much larger system. You enter data, labels, and formulas. The list of available functions is quite extensive and includes the four arithmetic operations, exponentiation, summation, integer, absolute, trig and log functions, square root, and random number.

You can also insert and delete rows and columns, sort rows and columns (a feature absent from many larger spreadsheets), and retrieve rows based on conditions you specify.

The ability to create graphs is quite nifty. Upon selecting Pie or Bar, a series of questions appear to ask what you want graphed (from and to what row) and the name of the graph. The computer then splits the screen in half and puts the data you specified in the left half and the graph in the right. The process is quick and painless.

All right, you say, it seems to have everything, but does it do windows? Sure. How many windows would you like—two, three, more? The system will produce them although, with a screen this size, two or three is probably all you can realistically use.

I-PIPS has other capabilities as well. Data can be formatted in columns (right, left, or center justified). Rows and columns can be copied from one part of a worksheet to another, or to another worksheet altogether. And, of course, worksheets can be saved or printed. All in all, a most impressive spreadsheet system.

Other Built-in Software

For performing calculations, you select I-CALC. The right portion of the LCD then displays, in a reverse field, a simulated calculator numeric keypad, and your $1000 IS-11 is transformed into a $10 calculator—well, perhaps a $25 calculator.

The calculator mode supports the four arithmetic operations and exponentiation. It has a single register temporary memory, but can also save and retrieve the results of calculations from the permanent memory of the machine.

HARDWARE PROFILE

Name: IS-11 Consultant

Type: Notebook portable computer

CPU: 8-bit Z80A (3.4 MHz)

RAM: 32K, expandable to 64K

ROM: 64K

Keyboard: 62 full-stroke keys, 8 special keys

Display: LCD, 8 lines x 40 characters

Graphics: 64 x 256 pixels

Mass Storage: Built-in 128K microcassette recorder; optional 3 1/2" floppy disk

Printer: Optional 40-col thermal

Ports: Parallel, RS232 serial

Modem: Optional built-in 300 baud

Dimensions: 11.8" x 8.4" x 1.4"

Documentation: User's Guide

Summary: Notebook portable with built-in integrated software for spreadsheet, limited graphics and database management, text editing, and communications. Accepts up to 64K ROM-pack applications software modules.

Price: $995 ($1095 with modem)

Manufacturer:
Sord Computer of America
645 5th Ave.
New York, NY 10022
(212) 759-0140

The personal computer has given birth to a shocking new personal problem:

Computer. Display. Keyboard. Printer. Disk drives. Telephone modem. Software.

Sure, you need it all. But what you don't need is it all over your home or office.

What you need is Actrix.

The whole computer system in one little box.

Actrix really is a whole computer system. A computer, electronic typewriter, display, two disk drives, telephone modem, and printer.

Plus a library of software that includes CP/M, M Basic, C Basic, Perfect Writer, Speller, Filer, and Calc, Money Maestro, Personal Pearl, Communications, and Font Generator.

Enough hardware and software to handle virtually every personal computer application.

And Actrix really is little: It's so compact that it's no bigger than a standard electric typewriter.

Another nice thing about it is the price. $2190.* For everything. Including all the software!

Price out any comparable system and you'll prove to yourself that Actrix is today's biggest value in personal computers.

You can even have it with high-performance options. Like an 8088 IBM compatible co-processor that supports MS-DOS and CP/M 86. A 1200-baud modem. Double-sided, double-density disk drives.

Actrix. The one personal computer system that doesn't fill up your office with components. That doesn't have wires trailing here, there, and everywhere.

That doesn't need its own special furniture.

Now, picking up a personal computer that doesn't create personal problems has never been easier.

It's the one you *can* pick up.

Actrix.

To find out where you *can* put your hands on one, call us toll-free: 800-682-8221. Or write: Actrix Computer Corporation, 2159 Bering Drive, San Jose, CA 95131.

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A whole computer system in one little box.™

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The built-in word processing functions, selected with I-EDIT, are similar to those found on the NEC 8201 and Model 100 and are suitable for basic text entry, editing, and printing. In addition, a word processing ROM-pack (I-WP) is available and offers more advanced functions such as cut and paste, word search and replace, and print formatting.

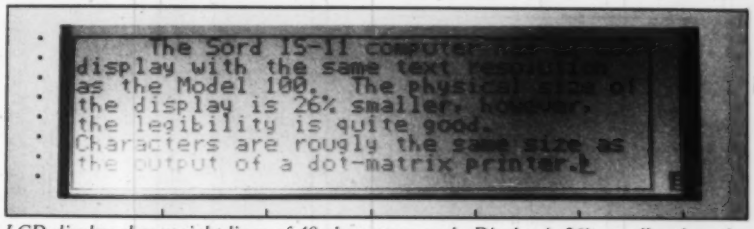
The communications capability is selected with I-COMM. Using an RS-232C interface, this module permits you to transmit and receive data from another computer or on-line database.

Applications Software

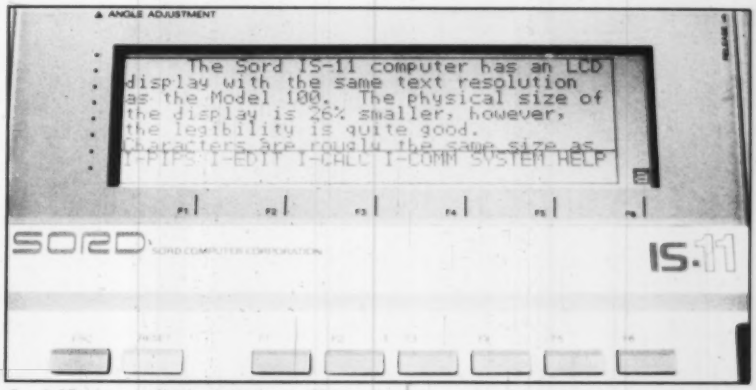
In addition to the integrated software, Sord plans to release generic application software in ROM-pack form. Packages in the works include: Sales-pack, Financial-pack, Business Security-pack, Time-Sharing Systems-pack, and Data Entry-pack. No details are available about these yet.

Perhaps more exciting is the ability of the IS-11 to accept custom 64K ROM-packs from third-party software suppliers and value added resellers. This capability should attract many outside suppliers to make and market software for the IS-11.

Moreover, the built-in 128K microcassette recorder can be used for data storage, thus opening up many applications that are not possible on the 8201 or Model 100. We see the inclusion of the microcassette in the IS-11 as a nice marriage of the most attractive capabilities of the Epson HX-20 and the 8201/Model 100.


The Sord IS-11 computer
display with the same text
as the Model 100. The physical
the display is 26% smaller,
the legibility is quite good.
Characters are rougly the same size as
the output of a dot-matrix printer.

LCD display shows eight lines of 40 characters each. Display is 26% smaller than the Model 100, but is quite legible.


ANGLE ADJUSTMENT
The Sord IS-11 computer has an LCD
display with the same text resolution
as the Model 100. The physical size of
the display is 26% smaller, however,
the legibility is quite good.
Characters are rougly the same size as
I-PIPS I-EDIT I-CALC I-COMM SYSTEM HELP
SORD
IS.11

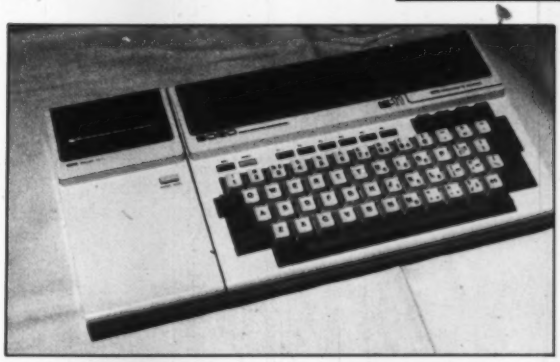
Sord IS-11 can display windows. Here, word processing text (top) is overlayed by function key definitions (bottom).

Microcassette recorder operates at 2000 baud; a C-30 cassette can store 128K of data.

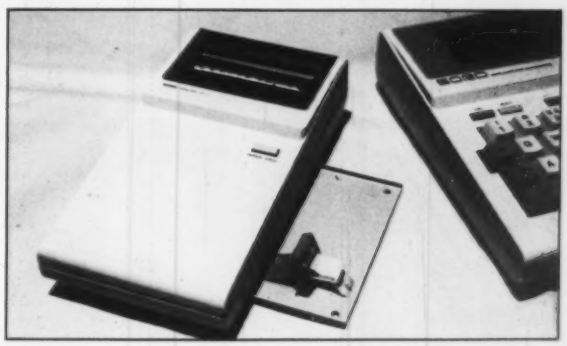
We see the inclusion of the microcassette in the IS-11 as a nice marriage of the most attractive capabilities of the Epson HX-20 and the 8201/Model 100.

Thermal Printer

An optional thermal printer (PT-11) styled similarly to the IS-11 is available. This plugs into the side of the computer. It prints 40-character lines and reproduces



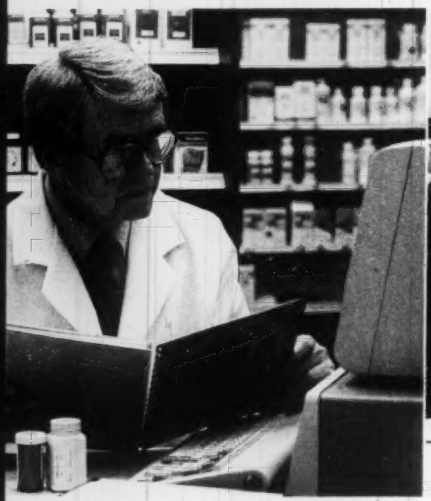
Optional 40-column thermal graphics printer attaches to left side of computer.



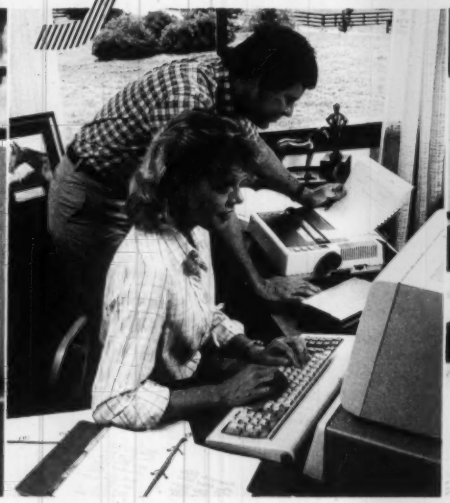
Printer attaches easily with connector and sliding door.

Your computer's telephone.

Hayes™



What are the adverse effects of this compound?



Gary: The pedigrees for next week's auction are as follows...

Sold 1000 shares at 33 for net profit of 6000. Richard.

Wouldn't it be great if you could use your IBM* PC to tap into vast resource libraries across the country? To transfer files to your partner, upstate? Or from your broker, down the street?

It's possible. All you need is a modem, to connect your computer to others. Down the hall. Or thousands of miles away.

Hayes Smartmodem. Think of it as your computer's telephone. Hayes Smartmodem 300™ and the faster Smartmodem 1200™ allow you to communicate over ordinary phone lines.

But any modem will send and receive data. Hayes Smartmodems also dial, answer and disconnect calls. Automatically. And without going through the telephone receiver, making them far superior to acoustic coupler modems.

Choose your speed; choose your price. The lower-priced Smartmodem 300 is ideal for local data swaps and communicates at 300 bps. For longer distance and larger volumes, Smartmodem 1200 operates at baud rates of 300 or 1200, with a built-in selector that automatically detects transmission speeds.

Both work with rotary dials, Touch-Tone® and key-set systems; connect to most time-sharing systems; and feature an audio speaker.

Smartmodem 1200B™ is also available as a plug-in board. Developed specifically for the PC, it comes packaged with Hayes' own communications software, Smartcom II.™

Smartcom II. We spent a lot of time developing it, so you can spend less time using it. Smartcom II prompts you in the simple steps required to create, send, receive, display, list, name and rename files. It even receives data completely unattended—especially helpful when you're sending work from home to the office, or vice versa.

If you need it, there's always "help." This feature explains prompts, messages, etc. to make communicating extra easy.

With Smartcom II, it is. Case in point. Before you communicate with another system, you need to "set up" your computer to match the way the remote system transmits data. With Smartcom II, you do this only once. After that, parameters for 25 different remote systems are stored in a directory on Smartcom II.

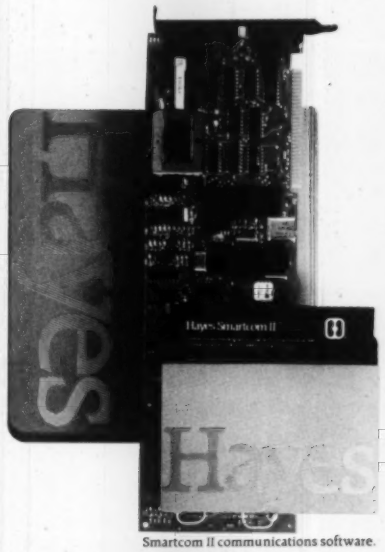
Calling or answering a system listed in the directory requires just a few quick keystrokes. You can store lengthy log-on sequences the same way. Press one key, and Smartcom II automatically connects you to a utility or information service.

Hayes®

CIRCLE 133 ON READER SERVICE CARD

Smartmodem 300, 1200, and 1200B are FCC approved in the U.S. and DOC approved in Canada.

Smartmodem 1200B. (Includes telephone cable. No serial card or separate power source is needed.)



Smartcom II communications software.

NOTE: Smartmodem 1200B may also be installed in the IBM Personal Computer XT or the Expansion Unit. In those units, another board installed in the slot to the immediate right of the Smartmodem 1200B may not clear the modem; also, the brackets may not fit properly. If this occurs, the slot to the right of the modem should be left empty.

And, in addition to the IBM PC, Smartcom II is also available for the IBM Personal Computer XT, COMPAQ Portable, Corona Portable PC, Columbia MPC, DEC Rainbow 100, Xerox 820-II, and Kaypro II personal computers.*

Backed by the experience and reputation of Hayes. A solid leader in the microcomputer industry. Hayes provides excellent documentation for all products. A limited two-year warranty on all hardware. And full support from us to your dealer.

So see him today. Break out of isolation. Get a telephone for your Personal Computer. From Hayes.

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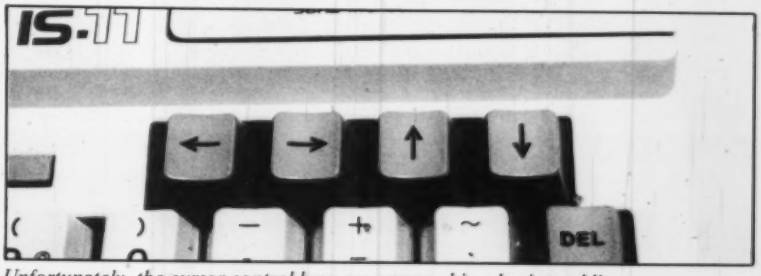
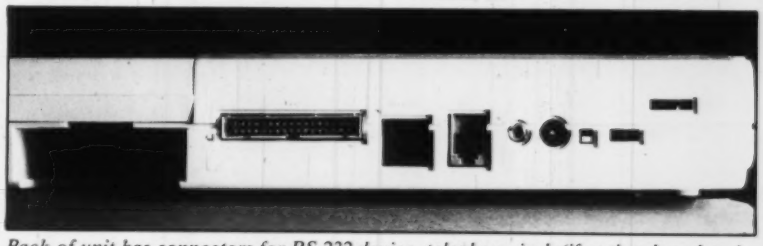
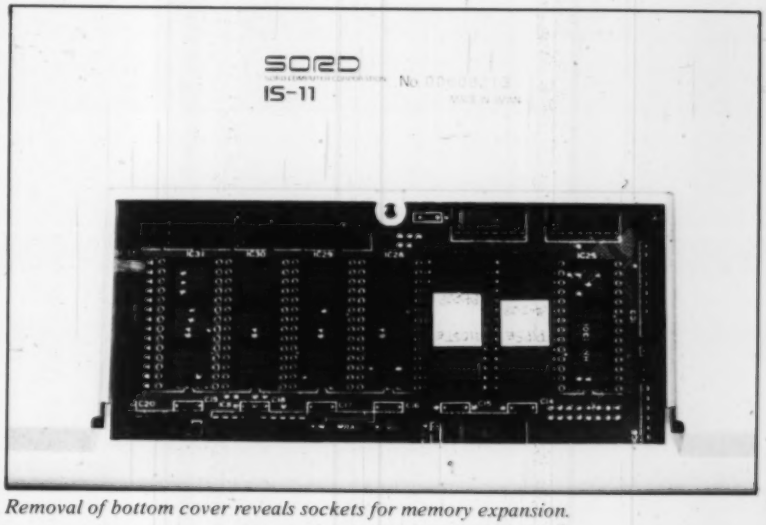


Unfortunately, the cursor control keys are arranged in a horizontal line.



Back of unit has connectors for RS-232 device, telephone jack (if optional modem is installed), parallel device, bar code reader, and AC adapter.



Removal of bottom cover reveals sockets for memory expansion.

full dot (pixel) graphics (320 dots per line). Print speed is 25 characters per second. Like other thermal printers, the PT-11 is completely silent.

The IS-11 can print the contents of the screen using the HCOPY command. In addition, all of the software modules have a print routine included.

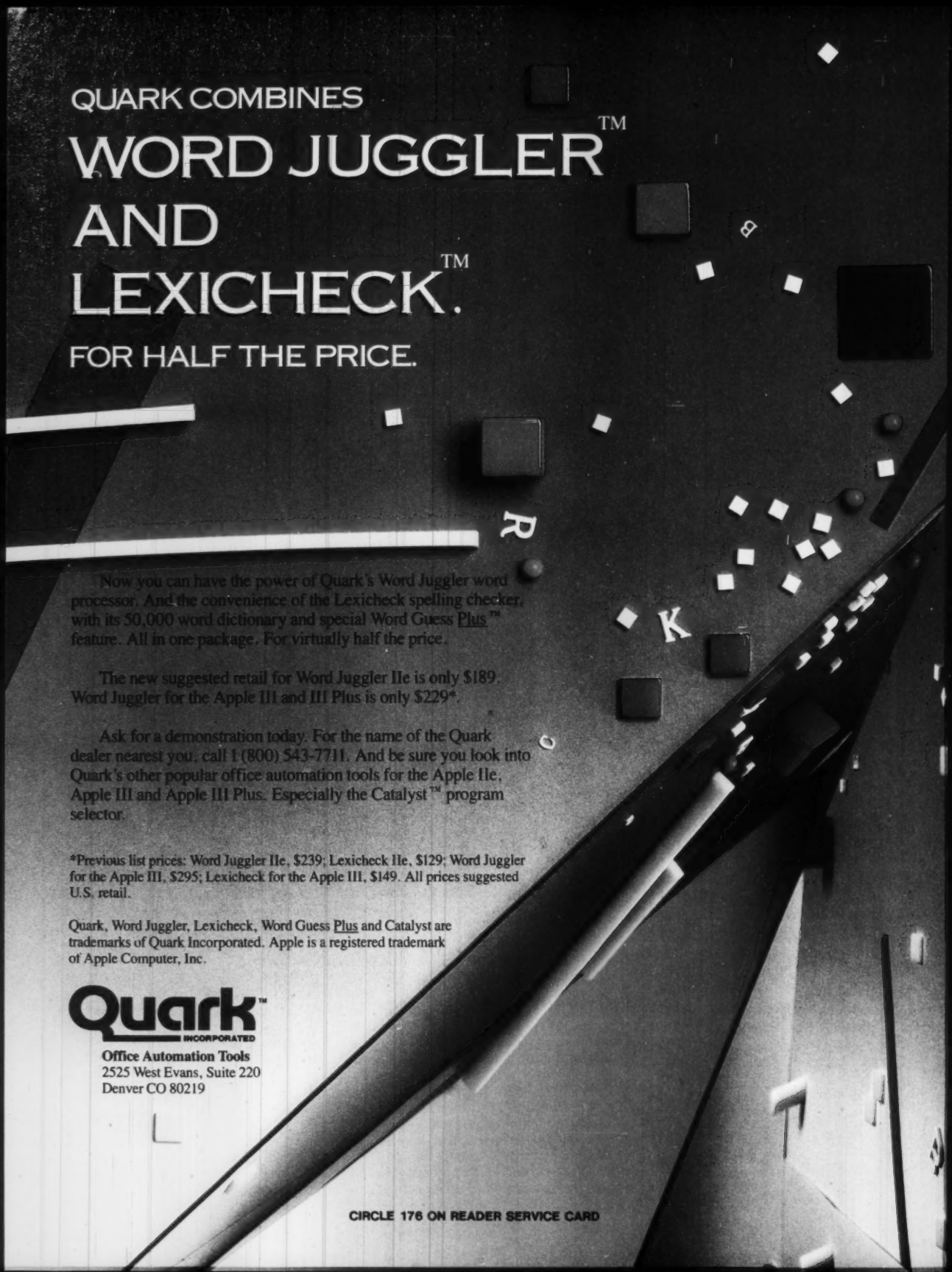
The Next Step

The Sord IS-11 Consultant is not a breakthrough on any front. Yet with its integrated software, it is a big step beyond the other systems currently available. We have seen compact computers with full-stroke keyboards, 40-column by 8-line displays, and microcassette records—but never all in one unit.

We have seen computers with built-in spreadsheet software (Workslate), text editing, communications, and rudimentary database software—but again, never all in one unit. And we have seen machines with plug-in ROM capability.

The main attraction of the IS-11 is not the hardware—indeed the LCD display is smaller than several of its competitors—but the integration of all the important computing functions in one, compact unit. At $995, the Sord IS-11 Consultant should be a best seller.

CIRCLE 402 ON READER SERVICE CARD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WORD JUGGLER™
AND
LEXICHECK™.
FOR HALF THE PRICE.
Now you can have the power of Quark's Word Juggler word processor. And the convenience of the Lexicheck spelling checker, with its 50,000 word dictionary and special Word Guess Plus™ feature. All in one package. For virtually half the price.
The new suggested retail for Word Juggler IIe is only $189. Word Juggler for the Apple III and III Plus is only $229*.
Ask for a demonstration today. For the name of the Quark dealer nearest you, call 1 (800) 543-7711. And be sure you look into Quark's other popular office automation tools for the Apple IIe, Apple III and Apple III Plus. Especially the Catalyst™ program selector.
*Previous list prices: Word Juggler IIe, $239; Lexicheck IIe, $129; Word Juggler for the Apple III, $295; Lexicheck for the Apple III, $149. All prices suggested U.S. retail.
Quark, Word Juggler, Lexicheck, Word Guess Plus and Catalyst are trademarks of Quark Incorporated. Apple is a registered trademark of Apple Computer, Inc.
Quark™
INCORPORATED
Office Automation Tools
2525 West Evans, Suite 220
Denver CO 80219
CIRCLE 176 ON READER SERVICE CARD

AppleWorks

Apple's Own Integrated Software Package

SOFTWARE EVALUATION

Steve Arrants

It is not unusual for Apple to release exciting and revolutionary hardware. Remember all the noise when Macintosh was released this winter? It *is* unusual for Apple to release exciting and revolutionary software. Without so much as a single press conference, Apple has released a new integrated package that no Apple IIe owner should be without.

AppleWorks combines a full-featured database with a powerful spreadsheet and an excellent, full-featured word processor for the Apple IIe equipped with an 80-column, extended memory board.

Of course, comparisons with such packages as *Lotus 1-2-3* leap immediately to mind. Is *Apple Works* a *1-2-3* for the Apple? The answers are yes, yes, and no. Yes, it features a spreadsheet; yes, it has a database; no, it doesn't have graphics capabilities.

The *AppleWorks* spreadsheet is slightly less powerful than that of *1-2-3* but it is comparable to *VisiCalc* and is one of the easiest of all spreadsheets to use. *1-2-3*, on the other hand, is more spreadsheet oriented and is a better choice if you perform many involved calculations. *AppleWorks* might be a better choice for most applications, however.

For one thing, the *AppleWorks* built-in word processor is very handy and extremely powerful (I have switched from *AppleWriter IIe* to *AppleWorks*,) and *1-2-3* does not have a word processor. The database in *AppleWorks* is far more complete than that in *1-2-3*, and the spreadsheet will make many users happy.

With that mandatory comparison out of the way, let's look at some of the features of *AppleWorks* and the specifics of its three programs.

Starting Up

When you first get the program you will, of course, want to back it up. Surprisingly, there is no copy-protection. The startup disk can be copied with either the DOS 3.3 CopyA program or the ProDOS copy utility, as can the program disk. *AppleWorks* is in ProDOS, by the way. You can use DOS 3.3 if you wish. Since ProDOS is the operating system on the disk, it makes sense to use it. Remember to convert your DOS 3.3 text files to ProDOS before using *AppleWorks* to edit them.

To begin, you boot the startup disk and then the program disk. The reason for two disks is that Apple ran out of space on the main disk—these are three large programs! After the program boots, you are greeted by the Main Menu.

The Main Menu shows you what the other menus will look like. Its half-dozen, multiple-choice selections are contained within a folder-shaped frame. Subsequent menus overlay each other so that it appears that the screen has overlapping windows. Looks are deceiving; however, windows cannot be sized, unsized, moved, or pulled down except under program display control. The advertising and some dealer hype may make you think you are getting a Lisa/Mac-like operating system. You aren't; although in the future, an update with the Apple mouse may allow something similar.

On the Main Menu, the first three choices concern what *AppleWorks* calls

SOFTWARE PROFILE

Name: AppleWorks

Type: Integrated word processor, spreadsheet, database.

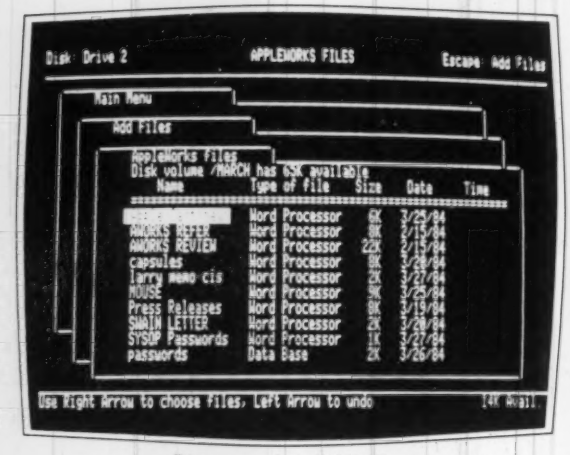
System: Apple IIe, 2 disk drives, 128K Apple 80-column card.

Format: Disk

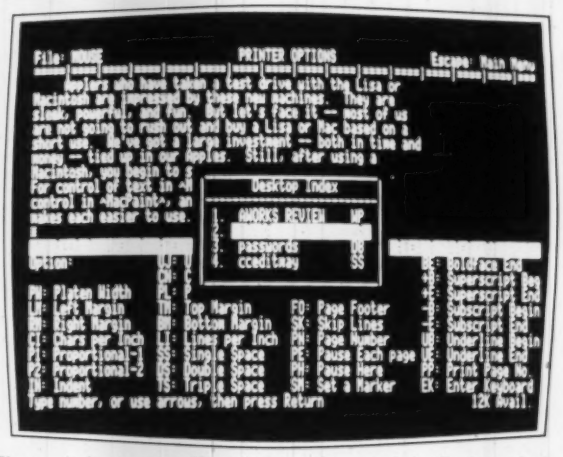
Summary: A versatile, well-designed package. Will make other computer owners jealous!

Price: $295

Manufacturer:
Apple Computer
20525 Mariani Ave.
Cupertino, CA 95014
(408) 996-1010



Directory of available files.


File: MOUSE
PRINTER OPTIONS
Escape: Main Menu
explorers who have taken a test drive with the Lisa or
Macintosh are impressed by these new machines. They are
sleek, powerful, and fun. But let's face it — most of us
are not going to rush out and buy a Lisa or Mac based on a
short test. We've got a large investment — both in time and
money — tied up in our Apples. Still, after using a
Macintosh, you begin to s
For control of text in <M
control in <MacPaint>, an
makes each easier to use.
Desktop Index
1. AMORKS REVIEW WP
2.
3. passwords DB
4. cceditasy SS
Option:
PW: Platen Width
LM: Left Margin
RM: Right Margin
CI: Chars per Inch
P1: Proportional-1
P2: Proportional-2
TM: Top Margin
BM: Bottom Margin
LI: Lines per Inch
SS: Single Space
DS: Double Space
TS: Triple Space
FO: Page Footer
SK: Skip Lines
PN: Page Number
PE: Pause Each page
PH: Pause Here
SM: Set a Marker
Type number, or use arrows, then press Return
12K Avail.

Three windows — wp file, printer options, and the Desktop Index.

the Desktop. This is your starting point. You may add files to the Desktop, work with a file already on the Desktop, and save Desktop files to disk.

Desktop

The Desktop is a special area of RAM set aside to contain the files. It is actually a built-in pseudodisk; i.e., a way to store and access your files quickly in RAM instead of having to use the disk drives. On my 128K IIe, the Desktop area starts up with 55K of available space for files. Obviously, this is one reason for the *AppleWorks* requirement of a 128K IIe.

On your Desktop you can have up to 12 files from any or all of the three application programs. This means you can be writing a memo about a proposed budget on one area of the Desktop, have a spreadsheet showing the budget on another, and hold a list of people to whom you want to send the memo in the database. You can then quickly move information among the files. The files are separate only in the sense that they are saved and recalled as self-contained units. Once files are on the Desktop, all of the information contained in them can be shared.

The *AppleWorks* command structure is built on the use of the Open-Apple key in the control-key sequence. Most commands and their effects are identical from one application to the next. You should be able to learn all three applications in only a few hours by following the included two-disk, interactive tutorial and using the manual for reference.

From the Main Menu, your first choice is to add files to the Desktop. Once you do that, another menu screen lets you choose whether you want to pick files from the data disk or start new files from scratch. If you pick files from the disk, a third menu screen displays a catalog and notes to which application they belong, their length, and the date and time each was last updated. The up and down arrow keys highlight titles of files. Hitting the right arrow key chooses a file; you can choose up to 12 files using this right-arrow marking. Once you have made all your choices, the files are loaded from disk onto the Desktop. If you want to generate new files, you simply indicate on another menu to which of the three applications the new files will belong.

No other word processor I have used is as versatile and easy to use as AppleWorks.

Once the files are on the Desktop, switching from one to another is very easy. The Open-Apple-Q (Quick) command opens a small window called the Desktop Index which lists all files currently on the Desktop. The up and down arrow keys highlight your choice, and when you hit RETURN, the screen changes to the new choice as your old file is automatically placed on the Desktop.

For example, I am writing this review in a file I am calling WORKREV, and I have some notes I took from the documentation in another file called WORKNOTES. While writing in the WORKREV file, I can easily review my notes by hitting Open-Apple-Q and choosing the WORKNOTES file. The review is replaced by my notes, and another Open-Apple-Q returns me to the review.

Moving Information

Switching between a word processor file and a spreadsheet or database file is a bit slower. First, the *AppleWorks* program must load in the new application program since only one of the application programs may be in memory at a given time. So you can switch instantaneously between files in one application, but you must wait 10 to 15 seconds when you move from one application to another.

Moving information from one application to another involves copying and moving from one area of the auxiliary RAM to another, called the Clipboard. Unlike the Clipboard area in Lisa/Mac this one is invisible, but it works in much the same manner.

Hitting Open-Apple-C (Copy) results in a question as to whether you want to copy within the document, to the Clipboard, or from the Clipboard. The Open-Apple-M (Move) command works the same way.

Suppose you want to move a paragraph from one word processor file to another one. Move the cursor to the beginning of that paragraph. Hit Open-Apple-M and then move the cursor down the lefthand side of the page. Every line you touch will be highlighted. You can then move into a line to take only a partial line length. When the text you want is highlighted just hit RETURN, and, in the case of a Move, the text disappears from the screen. A message appears to let you know that the text is in the Clipboard. The Copy command works in the same manner but places a copy of the text into the Clipboard, leaving the original intact.

Information may also be moved in this Clipboard, cut-and-paste manner from one application program to another. The only time there is an extra step is when the spreadsheet application

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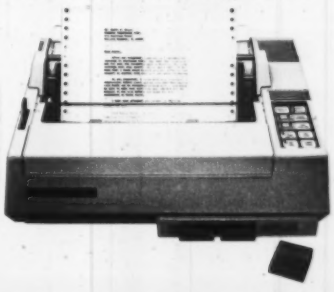
The TI 855 Printer

The printer for all major PC's



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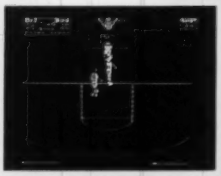
SOFTWARE ARTISTS?

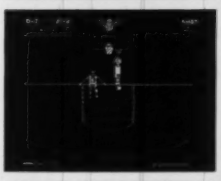
How we got this year's hottest sports game out of two rather inexperienced designers.

TO MAKE THE FIRST BASKETBALL PROGRAM that feels like the real thing, it helps to start with two guys who know what the real thing feels like.

Enter Larry Bird and Julius Erving. Bird – the hustler, the strong man, deadly from outside. Erving – The Doctor, maybe the most explosive player in the history of the game.

We talked to them, photographed them in action, studied their moves and their stats and their styles. Then we set out to create on computer disc an event which may never happen in real life. We put the two of them together on a dream court of light, for an electronic afternoon of one-on-one.



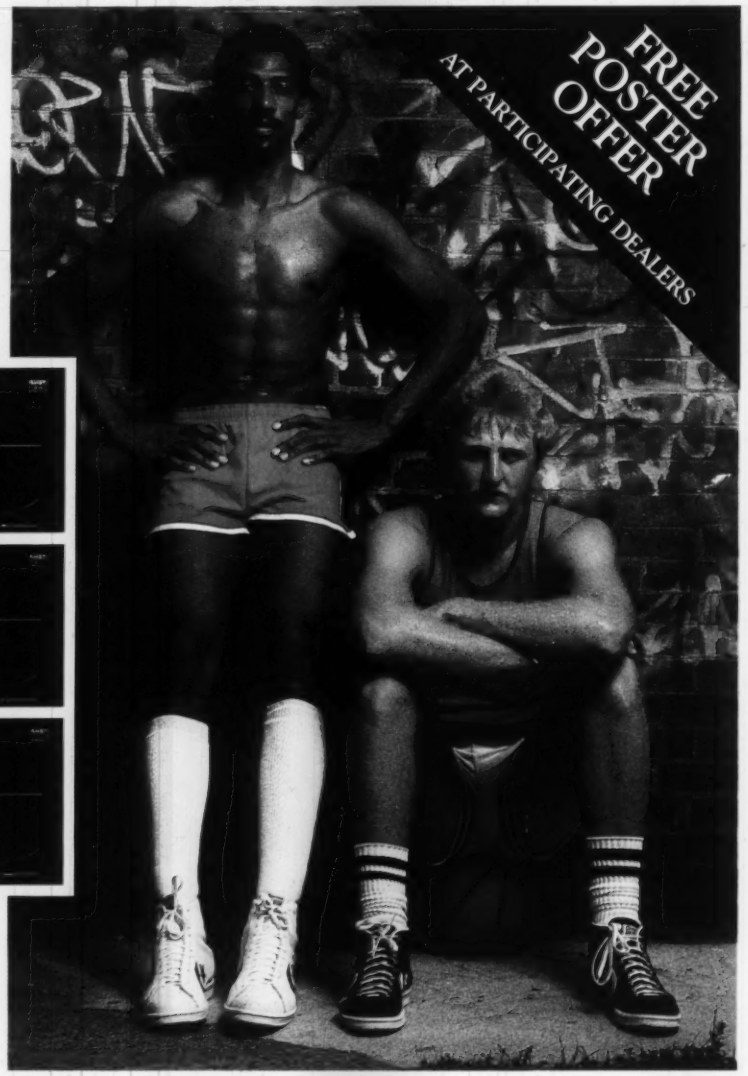


It wasn't easy. When they talked, we listened. When they criticized, we made big changes. When they gave suggestions, we took them.

And it shows. This thing is absolutely uncanny. You actually take on all the skills and characteristics of Bird or The Doctor – their own particular moves, shooting abilities, even strength and speed.

You'll meet with fatigue factors, hot and cold streaks, turnaround jump shots, and 360-degree slam dunks. But there's some whimsy in here, too – a funny referee, a shattering backboard, even instant replay.

It's called *Julius Erving and Larry Bird Go One-on-One.*™ You're Bird. Or you're The Doctor. And that's the last decision you'll have plenty of time to make.



Julius Erving and Larry Bird Go One-on-One is now available on diskette for Apple II, II+, and IIe computers. Apple is a registered trademark of Apple Computer. To find out more about Electronic Arts and its products, write us at 2755 Campus Drive, San Mateo, CA 94403 or call (415) 571-7171. For a free catalog, send a stamped, self-addressed #10 envelope. Also available for the Commodore 64. Coming soon on IBM and Atari home computers.

ELECTRONIC ARTS™

is involved.

To move information from a spreadsheet you must use the Open-Apple-P (Print) command. Don't worry—you print it to the Clipboard, not a printer. This seems a roundabout way to perform a simple operation. The arrow keys control cursor movements which highlight the areas that are being marked for movement.

The easiest way to coordinate data from different applications is to open a separate file to catch everything instead of trying to "wing it." Otherwise, if you mess up a Desktop file, you must manually fix it before saving—an involved process.

The Word Processor

The applications themselves range from very good to excellent. In-depth reviews of each could easily qualify as separate, stand-alone reviews. Let's look at the highlights.

The word processor is almost a what-you-see-is-what-you-get word processor. Such things as centering and margins are shown. You cannot see double-spacing or justification as you can with *AppleWriter,* however.

Despite this, I have switched from *AppleWriter* to *AppleWorks.* No other word processor I have used—*AppleWriter, Format II, Magic Window,* and *Screenwriter*— is as versatile and easy to use as *AppleWorks.* With just a few hours use, I fell in love with it.

The Delete, Move, and Copy commands are easy to use, through mnemonic control commands. The up, down, left, and right arrows quickly highlight blocks of text. Saving even long files, thanks to ProDOS, is quick and sure. There isn't that long, long wait associated with *AppleWriter* and other DOS 3.3 word processors. If you do forget a command, typing Open-Apple-? displays a complete help menu.

The Spreadsheet

The spreadsheet makes me, an ex-*VisiCalc* user, perfectly happy. The potential size of the spreadsheet is the same as in *VisiCalc*, though smaller than *1-2-3*, and features almost all of the same built-in functions.

As with any good spreadsheet, you use the cursor to move to different cells. Unlike most spreadsheets, however, you insert values into formulas rather than typing in locations. You can name cells, lock cells, change column widths—everything you would expect.

An extra feature is the way *AppleWorks* uses the highlighting capability of the Apple 80-column card. Let's take copying an area of cells for an example: You use the cursor moves to highlight the cells you want to copy—and they light up. You hit RETURN and then highlight the area to which you want to move the information. This same highlighting works on such things as changing column widths, deleting or moving rows and columns, and similar commands. Unlike *VisiCalc, AppleWorks* makes it almost impossible to blunder and enter incorrect parameters.

The Database

The database section resembles *QuickFile IIe.* You have the same ability to set up fields, change fields, add and replace new and old fields, copy records, etc. According to Apple, the database portion is a superset of the *QuickFile IIe* program. With the new *AppleWorks* Open-Apple and highlighting techniques, this is a versatile and easy to use database.

Hard Copy

Printing is accessed through a separate menu. Once you are satisfied with the content of your files, you can print them out on up to three printers connected to three slots. One printer must be specified as the default printer, and for most of us, one printer will do nicely. The menu-ed routines in *AppleWorks* support the Apple Imagewriter, daisywheel and Silentype printers as well as all old and new Epsons and the Qume Sprint 5 and 11. Adding print drivers is simple. Just answer the questions about printer type (dot-matrix or daisywheel), special control characters, the type of paper used and its size. Save this as your default printer driver.

Readable, humorous, and thorough, the manuals hold enough information to answer every question you might have without becoming pedantic.

Documentation

From a look at the preliminary documentation, it appears that Apple continues to produce some of the best user's manuals available. Readable, humorous, and thorough, the manuals hold enough information to answer every question you might have without becoming pedantic. The disk tutorials are excellent—you may only have to refer to the manuals for a quick explanation or refresher on some techniques.

A Few Complaints

As with any software package, there are a few missing or odd features. *AppleWorks* is no exception. My complaints are minor, but you should be aware of some features (or their lack) that may be important to you.

AppleWorks does not offer on-screen text justification. Apple explained that it was available in a preliminary version, but changed in the final release. It was felt that it was more important to pack the screen with information than to show what each printed page would look like. This feature is not important to me, but I know that it is desirable in some business situations.

I am not pleased with the manner of recalculation used by the spreadsheet. You can recalculate either by rows or columns. If a cell is out of order, it will have its formula recalculated with old values. Therefore, a bottom-line figure *must* follow the cells upon which it is dependent or the information will not be reliable. I found this out while doing my income taxes with *AppleWorks.* I tried converting a *VisiCalc* template, and when I saw what I owed the government, I decided to start from scratch.

AppleWorks is incompatible with most terminal programs for uploading files. *Appleworks* uses "soft" returns in text files. This means that returns are placed only at the ends of paragraphs or at text breaks. Most software and communications services accept only lines of a specific length—80 or 132 characters being the most common. So, to upload a text file, you must manually calculate line length and enter a return after each line.

The final flaw with *AppleWorks* is also the most disheartening. Although this program is available for the Apple III as *Three Easy Pieces* from Haba, Apple II and II+ owners are out of luck. Apple explained that the auxiliary memory routines are too complex to be adapted for use with the many RAM cards available. It is a shame that Apple appears to be abandoning the large base of Apple II's.

Summary

There is no doubt that *AppleWorks* is the most exciting, versatile, and well-designed program now available for the Apple IIe. The price of $295 might seem high, but consider the cost of buying a separate word processor, spreadsheet, and database. The level of integration offered by *AppleWorks* is generally unavailable in any other Apple IIe package. If Apple adds graphics and telecommunications applications, Apple owners will be the envy of IBM-PC owners everywhere.

CIRCLE 403 ON READER SERVICE CARD

Memotech MTX-512

In the hard-edged business of microcomputer journalism, you have to be prepared to make sacrifices, and to make them on a moment's notice. That is what being a professional is all about.

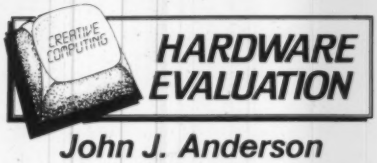
That is why I unhesitatingly sprang to the fore the moment the assignment came my way: a reconnaissance trip to London to look at the new MTX-512 from Memotech.

A tough job, but then, somebody had to do it.

In these very pages, we have repeatedly told you of the invasion of the microredcoats—told you that the British were coming, in no uncertain terms. We recently told you about the BBC Acorn and the ACT Apricot. We also previewed the Sinclair QL-10.

Now Memotech, which began as a Sinclair hardware peripheral manufacturer, has entered the fray with its own micro—the MTX-512.

And it is no mere clone or warmed-over CP/M machine. It is a sleek, sexy contender with some very unique features. If you have scanned the field of under $1000 machines and come up dissatisfied, the MTX-512 is assuredly worth a look.



John J. Anderson

Aston-Martin of Micros?

I usually leave the styling superlatives to sister publications, such as *Car and Driver* and *Stereo Review*, but in this case shall make a happy exception. The MTX-512 is a real looker. It is a computer capable of looking as "at home" in your living room as your stereo does. And if it *were* an automobile, it would invite comparison to an Aston. Both are machines to stop you dead in your tracks, asking with a silly smile, "hey, what's that?"

The MTX-512 resides within a jet black, brushed aluminum case. It is long, and low: 19 inches from stem to stern, yet only 8 inches across and a mere 2.2 inches high.

Touch the anodized case, and you can feel quality. Remember metal? That's the stuff they used to use a lot more of, before plastic came along. It gives the MTX-512 a bit of weight, which keeps it sure-footed on its rubber feet. What a pleasurable contrast to high-impact styrene.

One good-looking machine, to say the least. Feels good, too, like slamming the door on an XJ6.

Built for Performance

Though I will admit that things seem to be moving in the direction I'm about to describe, computers have not as yet assumed the mechanized role of sex symbol—as the automobile has somehow managed to do. Most people still care more about what a computer can do than how it looks. (Still, I imagine most people would be satisfied with a micro, as they would with a mate, that scored highly on both accounts.) You most certainly would not buy a car based *purely* on its looks. Nor would you buy a computer that way, right?

Pretty Is as Pretty Does

I am happy to report that the MTX-512 begs comparison with Astons and Jaguars for its *performance* as well as its looks. For beneath its beautiful skin, there resides a powerful, unique, and versatile design,

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CIRCLE 136 ON READER SERVICE CARD

in some respects grounded firmly in proven tradition, and in other respects, truly innovative.

Consider the case of the casing. That metal casing serves as more than mere status symbol, in contrast to the impact styrene covers of the Commodore 64 and Atari. It performs three important functions simultaneously. It obviously protects the innards of the machine. It acts also as a heat sink, draining off damaging component temperature extremes, and it serves as a Faraday cage, completely sealing off RFI (radio frequency interference) that can cause static for and with nearby radio listeners, and even impair the video quality of the computer's own output. The MTX-512 is one machine that sailed through FCC approval procedures with flying colors—the first time around.

Kitten on the Keys

Form follows function, example 2: let your fingers do the walking down the 79-key, full-stroke, sculptured keyboard. Tap them down to feel how really good keyboard touch should feel. Check the layout. Not true Selectric-style, unfortunately, (apostrophe not on the right but on the shifted 7, a la Apple II and C-64), but very nearly so. The numeric keypad is standard, with directional arrow keys overlaid upon them. Eight programmable function keys are on the far right of the top panel. Used in conjunction with the Shift key, another set of eight functions becomes available. The F and J keys are recessed for easy fingertip location and homing. On either side of the spacebar are two unmarked reset keys. Both must be depressed simultaneously to trigger a cold start. All alphanumeric keys offer full autorepeat.

A keyboard diagram is reproduced here as Figure 1.

Under the Hood

Okay, stop salivating on the upholstery. Get ready to fasten your seatbelt and we'll take it for a test drive. But first, let's take a quick look under the hood.

The processor for the MTX-512 is the tired and true Z80. Sure, you could argue that the Z80 is past its prime, but you surely can't argue very long about its shortcomings in comparison with other 8-bit CPUs. Memotech chose to go with a chip that has a productive and respected past—as well as future. The Z80 can do it all; it can perform quickly and address a good-sized chunk of RAM directly. It also raises the possibility (spectre?) of CP/M compatibility. And the Z80A inside the 512 operates at 4MHz. Radar detector is strictly optional.

HARDWARE PROFILE

Product: Memotech MTX-512

Type: Desktop microcomputer

CPU: 8-bit Z80 at 4MHz

RAM: 64K standard, expandable to 512K.

Keyboard: 79 keys, full-stroke

Text Resolution: 40 x 24

Graphics Resolution: 256 x 192

Color/Sound: 16 colors, 3 tone channels, 1 pink noise channel

Ports: Cassette, joystick (2) parallel printer, ROM cartridge. Serial ports optional.

Performance: Very good

Documentation: Fair

Price: $595

Summary: An excellent learning machine, built with an emphasis on quality. With a low-cost disk drive, could be an extremely versatile system.

Manufacturer:
Memotech Corporation
99 Cabot St.
Needham, MA 02194
(617) 449-6614

Included in the $595 base sticker price is 64K RAM, expandable to 512K (hence the model moniker MTX-512). Add to this another 16K RAM standard dedicated solely to screen memory. The video circuitry includes its own processor to handle video housekeeping.

Alive, Alive I/O

Also included as base-sticker standard are the following ports: variable rate cassette port (to 2400 baud), two digital joystick ports using industry standard (Atari) configuration, Centronics standard parallel printer port, ROM cartridge port, and uncommitted parallel port.

Available as an option is a communications board which carries two completely independent RS-232C interfaces (to 19,200 baud) and a disk drive bus. As mentioned above, RAM memory is optionally expandable to 512K. RAM can be added in increments of 32, 64, 128, or 256K.

ROM on Board

In addition to RAM for the main processor and screen display, the MTX-512 contains 24K of ROM with some really neat goodies packed inside. These include MTX Basic, "Noddy," a simple, Pilot-like text-handling language, an assembler/disassembler, and ground-breaking "Front Panel" program that allows all three languages to interact in concert. We shall examine this software in a bit more detail up ahead.

ROM expansion can take place internal to the MTX, or through the ROM cartridge slot, to a maximum of 72K. That would imply quite a smart machine indeed.

Does Windows, Too

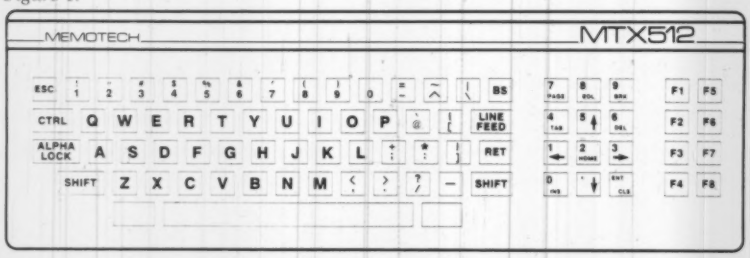
The screen specs of the MTX machine are as impressive as its physical look. Separate outputs are offered on the back panel for monitor and TV (with internal RF modulator). Graphics resolution is 256 x 192 pixels in 16 colors. Text resolution is a standard 40 x 24 characters in a unique and pleasing font.

In addition to conventionally bit-mapped modes, the MTX-512 offers 32 user-definable sprites—which are controllable through high-level Basic commands. This means that sprites and sprite movement can be defined straightforwardly from Basic without recourse to cryptic POKE commands.

The MTX also has a unique and powerful windowing feature: eight user-definable "virtual screens"—controlled through special Basic commands—are available. The result is Basic-programmable text or graphics windows with remarkable ease of control.

Hi-fidelity sound is pumped through the RCA phono plug output on the rear of the MTX unit. Four channels are available—three independent tone generators,

Figure 1.



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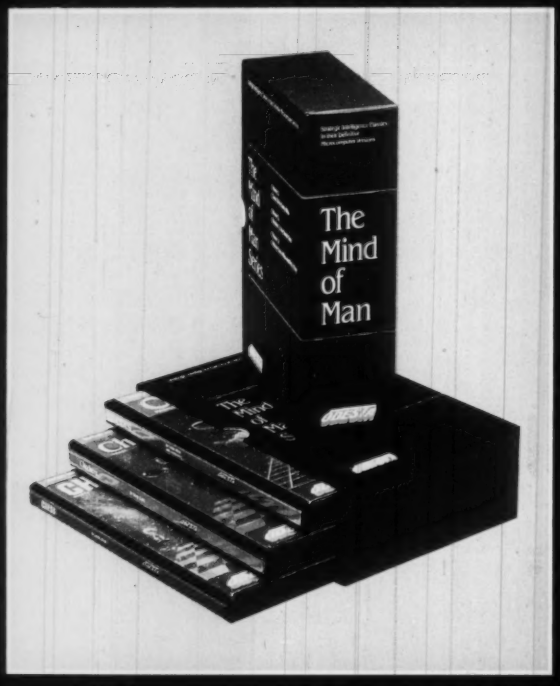

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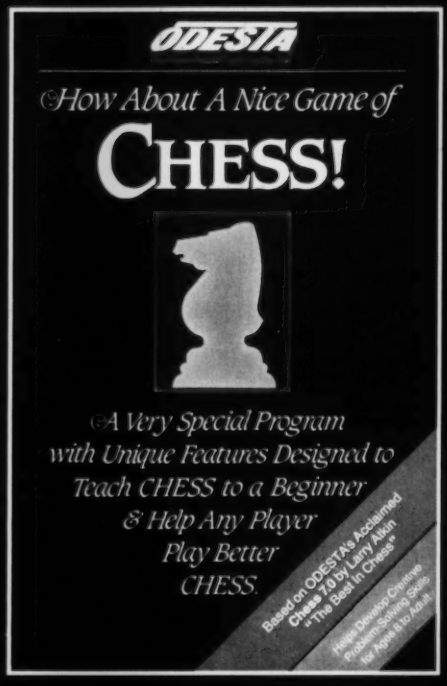
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and a "pink noise" channel for percussion and sound effects. Alternatively, sound is also routed through RF for output on a standard television set.

Powering Up

Let's start her up and take her around the block.

There is no power switch on the MTX-512 itself; rather, we find an illuminated rocker switch on the matching external power supply used to turn the computer on and off. Flip it on, and we have ignition.

Upon power-up, we are in MTX Basic. This dialect is very much like Microsoft Basic, with a large number of added special graphics, sound, and window commands (see Figure 2).

Noddy is a text manipulation language that reminds me a bit of Logo, and even more of Pilot. Noddy is British slang for "simple," and that it is. Using Noddy, even a child can master sophisticated branching capabilities. The language provides a tremendously easy-to-use method of programming the computer to display information or ask questions, then branch to a new screen based on the response to the old one. Available Noddy program commands appear here as Figure 3.

Here another unique facet of the MTX architecture becomes apparent. Basic and Noddy are completely interactive, allowing screens to be named, constructed, incorporated into a tree structure, and then called from Basic programs. On exit from Noddy to Basic, all Noddy screens and programs are left intact. In situations where branching text screens are needed, Noddy is the way to effect them—and Noddy can effect them seamlessly from within Basic programs.

Also onboard ROM chips and accessible from power-up is a powerful Z80 assembler/disassembler. Source and object code occupy the same space in memory, allowing very compact storage of large assembly language programs. As with Noddy, MTX Basic can also interact fully with this module as well. As a result, machine code programs may be included within a Basic program and assembled as the program is run—there is no need to define fixed areas for the machine code to reside—and no USR addresses to calculate or miscalculate.

The Front Panel Display acts as a dramatic machine language tutorial and has helped as far gone an assemblerphobe as me overcome fear of the stack. The name comes from a time when computer keyboards had yet to be perfected, when programming took place across banks of lights and toggle switches on the front panels of the behemothic ancestors of today's micros.

The MTX front panel is an interactive program which allows manipulation of the contents of memory and Z80 registers.

Command Words — MTX BASIC

ADJSPR	DIM	LPRINT	REM
ANGLE	DRAW	MSVPR	RESTORE
ARC	DSI	NEW	RETURN
ASSEM	EDIT	NEXT	ROM
ATTR	EDITOR	NODDY	RUN
AUTO	ELSE	NODE	SAVE
BAUD	FOR	ON	SBUF
CIRCLE	GENPAT	OUT	SOUND
CLEAR	GOSUB	PANEL	SPRITE
CLOCK	GOTO	PAPER	STEP
CLS	IF	PAUSE	STOP
CODE	INK	PHI	THEN
COLOUR	INPUT	PLOD	TO
CONT	LET	PLOT	VERIFY
CRVS	LINE	POKE	VIEW
CSR	LIST	PRINT	VS
CTLSPR	LLIST	RAND	
DATA	LOAD	READ	

Figure 2.

NODDY COMMANDS

BRANCH ENTER PAUSE
IF ADVANCE LIST
GOTO RETURN OFF
STACK DISPLAY

When working in NODDY you can:
1) create a page by giving it a title of your choice.
2) type DIR to see what pages already exist.
3) look at a page already in the DIRectory by typing its title.

NODDY also allows you to construct PROGRAM PAGES using the commands listed above, to manipulate and display text interactively.

Figure 3.

FRONT PANEL DISPLAY Commands

B followed by Y (i.e. BASIC, then Y/N) returns user to BASIC
C clears the List screen
D displays memory in hexadecimal
G (go) runs a block of code defined by the user
I cycles the display between ASCII characters or machine code values currently in memory
L lists memory contents from a given hex address
L. lists memory contents from current Program Counter address
M moves a block of memory to a given address
R alters contents of a given Register
S single steps through code from current Program Counter address
T as above but treats Calls as one instruction
X displays alternate Register set
= moves Register cursor
– moves memory display cursor backwards
<enter> moves memory display cursor forwards
↑ moves display up
↓ moves display down
<brk> stops a program and displays register contents

Figure 4.

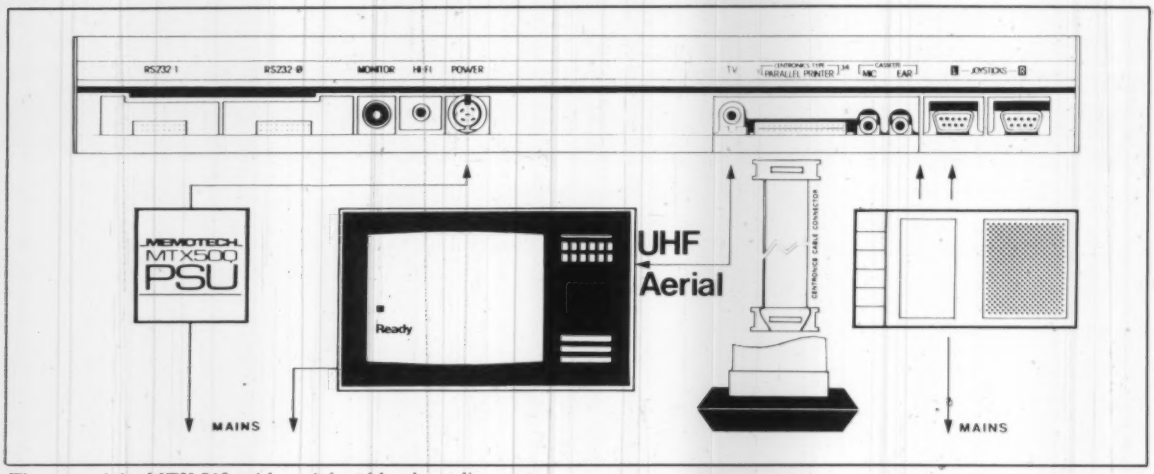
It is useful for tracing the internal interactions of the computer while a simple program runs. In fact I could recommend no better way to master beginning Z80 assembly instructions.

The program is also obviously a big help in debugging machine code programs. It displays the contents of all registers and command pointers during program execution. Figure 4 presents the commands available from the front panel.

"Tired" Analogy Strikes Again

Earlier I compared the MTX to British luxury/performance cars to underscore its appointments and quality construction. It turns out the comparison is especially fitting when describing the screen editor of the machine as well.

Americans have gotten as used to full-screen editing as they have to driving on the righthand side of the road. Want to make a change? Use the cursor keys to



The rear of the MTX-512, with peripheral hook-up diagram.

move the cursor over the offending code, make the change, then press Return. As far as we Yanks are concerned, that is the way to make an alteration.

Well when you first sit in front of an MTX-512, you may get the feeling that the steering wheel is on the wrong side of the computer. The screen editor is powerful, but it just doesn't work the way you expect it to. First of all, editing takes place within a four-line virtual screen at the bottom of the display. To change a line, retype its number to bring it into the editing window. Then you can make the change.

At first, you may find the effort of mastering the MTX editor a bit of a chore (and at times a bit scary—like the first time you drive on the lefthand side of the road). With a little practice, however, you will overcome the urge to move the cursor straight up out of the editing window to make changes at the top of the screen.

The MTX editor does effect immediate syntax checking, and positions the cursor at the offending character in the rejected line for easy alteration.

All Basic and Noddy language commands can be abbreviated during entry and editing, and will appear in non-tokenized form when listed. Basic lines can be entered in upper- or lowercase with commands listing in uppercase. Extra spaces will automatically be trimmed off upon listing as well.

Ringing Up the MTX-512

The MTX is undeniably engineered to compete head-to-head with the Acorn in the field of education. The Acorn is a big seller in Britain and is sanctioned by the BBC, which is influential not only in the U.K. but in many places worldwide. The Acorn hence has quite a head start on the 512 on this account. (As an aside, we are very disappointed to report that no Acorn has of this writing appeared at the lab for exhaustive evaluation. U.S. entry of the machine has been delayed for a half-year now).

The MTX competes favorably with the Acorn, however, as a heavy-duty education machine, and if Memotech can effect distribution in this country before its rival, it may get a chance to cut ahead in the development of a U.S. beachhead.

The MTX competes favorably with the Acorn as a heavy-duty education machine.

One facet of the MTX-512 that is sure to interest educators is the "Oxford Ring" node software, which may be used inexpensively to link up to 255 MTX units together. The software can pass all manner of programs, mail, and data among all members of the ring. A hard disk unit can complement the ring and be accessed by slave as well as master units connected to it.

In a classroom situation, this kind of network can improve the quantity and quality of learning by allowing one instructor to teach one concept while allowing all students immediate interaction with the concept being taught. This contrasts markedly with a group of computers all running free and unattended by an instructor.

I saw the Oxford Ring in action in no less fitting a locale than Oxford itself and can report with confidence that it really works. This is more than I can say for the BBC Acorn, which claims networking capability but has so far not delivered on the promise, at least in front of American witnesses.

Of even greater interest to educators will be the cost of the node system—$20 per computer. That is quite a bit less than any other working node system I have seen.

Breakneck Benchmark

I myself am not a big believer in benchmarks, and so feel compelled whenever I invoke them to preface things with some sort of disclaimer. Remember, folks, no one statistical method reliably tells you which computer is better than another. You must decide that for yourself.

I can report without qualification, however, that the David H. Ahl Quickie Benchmark is as fair and simple a micro benchmark test as I have seen. We have used the program to compile benchmarks on everything from the Sinclair ZX81 to the Cray 1. Despite a distrust of benchmarks, I have gotten into the habit of running this one on every micro I evaluate for *Creative Computing*.

The MTX-512 fared quite well indeed on its go-round with the test, coming in at 46 seconds, with an accuracy of 0.000252962112 and a sum random of 6.9. (No benchmark feature appears in this issue, but details on the test can be found in past and upcoming issues.) This was well ahead of the Epson QX-10, TRS-80 Model 4, Atari 400 and 800, Commodore 64, and TI 99/4A, though it is slower and slightly less accurate than the BBC Acorn. In all, a very respectable showing.

(Remember, as the benchmark runs from Basic, we are measuring the speed of Basic as well as processor speed in conducting these tests.)

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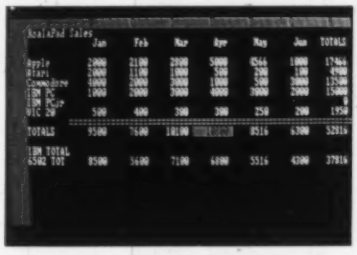

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Color	Monochrome
White	Flash
Red	Underline
Green	Background
Blue	Bright Up
Yellow	Reverse
Magenta	
Cyan	

Figure 5.

The Toaster Oven

Two external mass storage devices will soon be made available for the MTX-512. They both reside in handsome, coordinated cases which I quickly dubbed "the toaster oven" not because they get hot, but because of their unique look. (Though the units do get lukewarm, you'll be wasting time trying to do English muffins in them.) The chassis is exactly as long as the keyboard unit, and again, is made of extruded brushed black aluminum (or aluminium, if you're a Tory). A monitor can very conveniently perch atop a toaster oven, at a comfortable and readable height.

The disk-based systems come in two flavors: dual 5 1/4" floppy, and floppy/Winchester hard disk. "Silicon disk" boards are also available to simulate instantaneous access disk drives. A little more about that appears up ahead.

In addition to the storage devices themselves, the toaster oven sports an internal card cage which accommodates a computer expansion board (standard), a color 80-column board with RGB output (standard), up to four "silicon disk" memory boards (optional), and battery back-up (optional). Also available from this chassis is an additional parallel port for further bus expansion.

The CP/M Connection

With both the FDX floppy version toaster oven and the HDX Winchester version toaster oven, the CP/M operating system is used. A CP/M 2.2 disk comes standard with every unit. More FDX units can be hooked together to create a multidrive CP/M system.

With the advent of CP/M on the MTX system, reams of tried, tested, and terrific software become available. And running CP/M on the MTX is not like running it on any other system. The screen display is truly superlative.

Toasted RGB with Buffer

Try 80 columns by 24 lines in seven colors on for size, with two 96 element character sets, each sporting true, easy-to-read descenders. RGB graphics mode offers 160 x 96 pixel resolution and teletext compatibility. Want to talk speed? Screen update takes place at an average of 25,000 baud. That means an entire text screen can change in about the time it takes an IBM PC to scroll a single line.

Then there is the fact that the MTX-512 automatically turns monochrome software into color software (see Figure 5). It translates special character modes into color changes, which are much easier to recognize and work with. Once you have had a chance to run CP/M on a Memotech, it will be hard to return to any conventional CP/M system.

Slipping in Silicon Disks

Each Memotech silicon disk is a quarter or one megabyte fast-access RAM board, capable of emulating CP/M drives 0 to 13. Four such boards may be mounted within the HDX or FDX toaster oven chassis, providing from one to four megabytes per card frame. However, the silicon disk controllers can supervise four logical drives of up to 8 megabytes each—giving a maximum silicon storage of 32Mb.

Silicon storage is superior to floppy and hard disk storage. It is up to five times faster than a Winchester disk, and *50 times* faster than a floppy. It reduces disk wear and swaps, and enhances disk reliability. And the cost of silicon storage continues to drop.

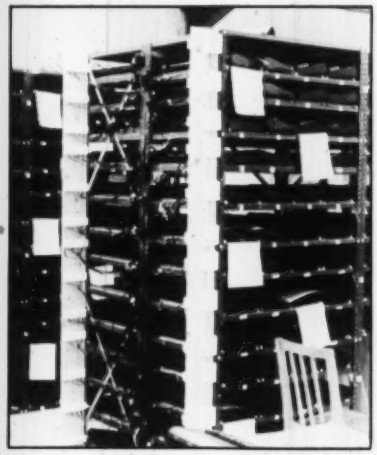
Picture it: a 512K color CP/M machine, with 160 megabytes of floppy, hard disk, and silicon storage! Probably enough to handle the NORAD system—and in seven colors yet.

Print About the Printer

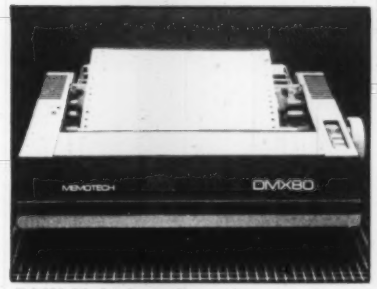
We were impressed from stem to stern by the MTX-512 and its companion units, the FDX and HDX. Then we got a look at the companion printer, the DMX-80. This unit, OEM Panasonic, is perfectly matched to its master. It is turned out in jet black Memotech livery, with a brushed texture, and has the Memotech red pinstripe across it as does the MTX-512. The machines make a handsome pair. The DMX-80 is an Epson work-alike and

Assembling power supplies for the U.S. version of the MTX-512.

Dick Govatsky, U.S. marketing director for Memotech, shows off the brains of the operation.



A 24-hour burn-in is standard along the assembly process. When the computer comes out of the box, it will work.



DMX-80, high quality at low-cost, in MTX-512 livery.

produces a typeface nearly identical to that of the MX-80 (Figure 6). While it is no speed demon, it is tolerably fast, quiet, and easy to use. Parallel interface cabling is trivial.

And that's not all. The real news about the DMX-80 is that it costs a mere $400, and comes with a one-year guarantee on *everything*. That is an unprecendented value. When you look at, touch, and operate the printer, it becomes clear that it is built durably and for keeps, and Memotech is willing to bet a year on its quality. Congratulations, Memotech, on a savvy choice of printer.

```
BCDEFGHIJKLMNOPQRSTUVWX
#$%&'()*+,-./0123456789
stuvwxyz{|}~ !"#$%&'()*
defghijklmnopqrstuvwxyz
EFGHIJKLMNOPQRSTUVWXYZ[
 !"#$%&'()*+,-./0123456
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abcdefghijklmnopqrstuvw
RSTUVWXYZ[\]^_'abcdefgh
CDEFGHIJKLMNOPQRSTUVWXY
456789:;<=>?@ABCDEFGHIJ
%&'()*+,-./0123456789:;
```

Figure 6.

The Downside

Well the superlatives have sure been pouring in for the MTX-512 for the past 3000 words or so. The MTX system has once again shown the flair the British have when it comes to designing microcomputers. If you will allow a generalization, it seems they excel in putting together teams of talented individuals—and achieving uncompromised results. I am sure that Memotech is quite proud of its new baby.

What is there, then, to complain about? Well really only a few items, though a couple of those items are of more than passing significance.

Foremost on my list of caveats is the lack of an inexpensive disk drive system controllable from Basic. As it stands, the MTX-512 is a cassette-based system, and the only redress is a $1300 dual drive system running under CP/M. This is definitely a problem.

Cassette-based storage may be an acceptable proposition to the British hobbyist, but I do not think it will be acceptable in the long-term to the kind of American customer to whom the MTX-512 will appeal. When I was in London, I urged the brass at Memotech to rethink the situation. I guess they agreed, as negotiations are now in progress to OEM a moderately-priced drive from Indus, which will provide random access storage from Basic. (The Indus drive wasn't a tough one for me to think of or to suggest—it is already jet black, with a brushed texture, and already exudes quality, as befits any Memotech product. At the same time, it commonly retails for $420—a far cry from investment in the $1300 FDX toaster oven. It is very affordable to the hobbyist.)

As to if and when this eventuality will come to pass, that is a sticky one to call. Creating the controller board and drivers should not be such a tough task. However, MTX Basic as it stands has no hooks to anything other than serial-access cassette, and a ROM software revamp could cause additional delays. We shall wait and see.

In fairness, I should report that cassette transfer on the Memotech seems relatively fast and relatively reliable. Audio data "squeal" is routed to the TV speaker to confirm data transfer as with the Atari (but unfortunately not the C-64). Baud rate is selectable to 2400, twice as fast as the Model 100 and more than twice as fast as most other cassette systems.

I admit my unreasonable prejudice, based in large part on traumatic experiences in my past. The problem with cassette systems is that they use cassettes, that's all. I was therefore disappointed to have to use cassettes with the MTX-512. It felt a bit like having an opportunity to drive a

Testing circuitry all along the line assures a quality-controlled product.

Testing video output for proper alignment and signal adjustment.

Jag—but only up and down the driveway. I couldn't make it to the street.

Another facet of the mass storage snafu is that no FDX was made available to us for evaluation. I saw about a half dozen working units when I was in Oxford, but the U.S. production line had not begun in earnest at the time of this writing. As a result, I can speak definitively only of the MTX itself and the DMX-80 printer—not of the toaster oven. Though I'm sure the FDX will live up to its specs, Memotech did not take advantage of the opportunity to prove it to me.

My other reservations are more nit-picky. The Return key is too small, and I found myself hitting Line Feed all too often by mistake. Maybe I'm a klutz, but I'm also used to Return keys designed for klutzes.

I'm also not so sure about the reset configuration. It seems to me too easy to rest your palms on the machine in such a way as to invoke a cold start, conceivably wiping away a great deal of work (a stroke-inducing phenomenon with which I am all too familiar—if there is a way to screw up hours of work, I will always find it). Though it is a novel approach, I think I would prefer the more conventional recessed back panel reset button.

For the price, the MTX-512 is a beauty—inside and out.

The documentation, while nearly complete and well-indexed, is rather perfunctory in places. The irony is that here we are with all these wonderful Basic commands to control virtual screens, but without the kind of documentation that really might prepare us to use them in a practical way. I felt the same lack when it came to sprite graphics, sound, drawing, and color commands. The style is uneven. Upon introducing a topic, the documentation treats you like an utter novice (as it should). Then, two pages later, it reads like a college programmer's text. The inconsistency is disconcerting.

The Kicker

If Memotech can straighten out the mass storage situation, it will have in the MTX a very strong contender in the U.S. market. The other criticisms I have made of the unit pale in contrast to its myriad capabilities. The task for Memotech is to

Grabber Grabs Me

There I was on a tour of Memotech in Oxford, on a foggy day in mid-February. I had been up most of the night before and was feeling less than 100 percent, as we say in New York. We hadn't eaten any lunch and had been on our feet for about five hours. And yet I could hardly contain my enthusiasm for the demonstration.

There in front of me was the most incredible video frame grabber I had ever seen. A couple of fellows were aiming a video camera around the room, and it was difficult to believe that the picture they created on the video screen was not analog, but *digital*.

It was stored in RAM memory just like a spreadsheet or this article. And yet, it was nearly photographic in quality and detail. It was all I could do to keep my mouth shut when they aimed the thing at me.

They froze an image of my face, then showed what they could do with the digitized image. They divide the screen into four windows, each with the original portrait inside it. They changed its colors, enhanced the contrast between its colors, rotated, moved, and superimposed images of the portrait on other images.

There have been hi-res frame grabbers before, and there will be more in the future. But the Memotech hi-res image processor represents a breakthrough in performance for the price. Sure, it's pricey—about $14,000 at the current rate of exchange for the pound sterling. But capability of this quality cost three times as much before Memotech came on the scene.

Members of the hush-hush, ultra-secret hi-res team, cueing up a shot.

The demonstration was so impressive, I had to stop thinking about the good old MTX-512 until I had seen everything it could do. All I can say is "wow." And as memory prices continue to drop, it is not inconceivable that this technology will become affordable to the hobbyist.

The author, in nearly photographic-quality hi-res. Note how well jet-lag has been depicted digitally.

When it does, the now clear line between "computer graphics" and "video" will be destroyed forever. It will be impossible to tell what comes from a laser disc and what from RAM. Gone will be the days when computer generated pictures could be identified by their lack of resolution, or "computerish" look. And a new vista will open for the user within microcomputer art.

The frame grabber device is a clear example of the research and development brilliance currently populating Memotech, and which is assiduously guarded by the company (hence no names shall appear here). Fellows, you know who you are. You should be very proud. Keep it up!

—JJA

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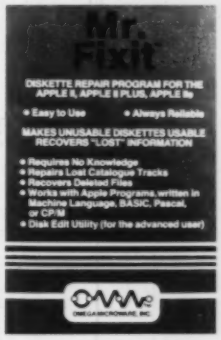
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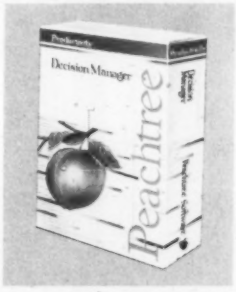

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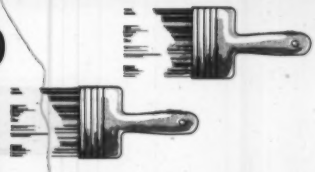

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make the MTX-512 truly available in the States, so that those of you who are interested can go give it a look, the way I suggested at the top of this piece.

Memotech must also get the machine into the hands of U.S. *software* houses. I never criticize a new machine for lack of software. But a year from now, the MTX must be supported by the best of U.S. houses, if the hardware is to survive. The British software I saw is, for the most part, a pace behind our own.

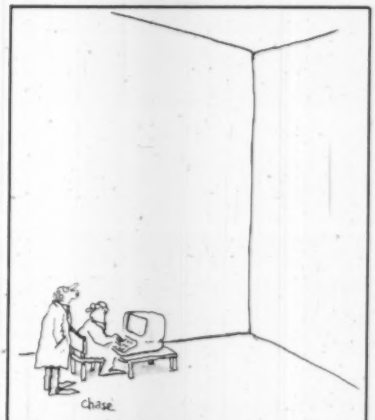
Memotech has announced a ROM cart word processor, *New Word*, based on *WordStar*. We did not receive an evaluation copy, but it seemed to work quite well during demos in London. Remember, as it stands, you will be using cassette storage with the package.

American software firms Infocom and MicroProse have announced that they will support the MTX-512. Other companies are expected to follow once the MTX begins to move a bit in this country.

Obviously then, distribution is no trivial concern for imports such as this one. We have watched a number of innovative British machines fall by the wayside in this country *not* because of competition, but for lack of adequate marketing channels. We have heard potential buyers and software developers tell us they could not find a machine, could not contact manufacturers at numbers we provided, and that when they did manage to get through to someone, the response was uncaring, uncoordinated, and unsure.

We trust that this will not be the case with Memotech, which already has some experience with the U.S. market. And in this extremely important distribution effort, we wish Memotech the greatest success. Like Kate Bush and Bill Nelson, this British import is deserving of a niche on our shores. For the price, the MTX-512 is a beauty—inside and out.

CIRCLE 404 ON READER SERVICE CARD



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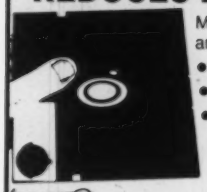

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The Idea Processor

A Step Beyond Word Processing

CJ Puotinen

To anyone perusing the ad pages of catalog-thick computer magazines, it seems that every issue brings a hundred new programs, each claiming to do more different things faster than every other program. To complicate matters, most programs—old or new—are so difficult to learn, use, and understand that finding one to match your needs is often only the first step in an increasingly frustrating journey.

Into this chaotic arena has stepped a new and different performer, *The Idea Processor.*

Here is a program that lives up to its name, taking you a step beyond word processing into text management. More important, it is easy to understand and operate, truly simplifying any project from routine correspondence to technical reports, project proposals to Christmas card lists, household inventories to office recordkeeping, short story manuscripts to Gothic novels, and doctoral theses.

The Idea Processor combines a text editor (word processing program) and cardfile (text database management system). It runs on the IBM Personal Computer, PC XT, and IBM-compatible computers with 192K of memory and dual disk drives.

The Editor

The Editor offers all the standard word processing features. For example, with a single keystroke you can delete a single letter, a single word, an entire line, part of a line, or a block of text. Unlike many programs, *The Idea Processor* allows you to replace anything you erase accidentally.

Search commands find and can replace any word or phrase up to 40 characters in length. Global search and replace commands change every occurrence of a word or phrase automatically or through individual verification.

Block commands mark any section of text up to 1500 words in length and then move, copy, or erase it. Blocks of any size can be transferred to another file for storage.

The Idea Processor also displays underlining and boldface letters on the screen, something appreciated by those whose word processing programs mark such featured text with hard-to-find screen characters.

The print-on-screen option lets you preview any page or the entire file.

It is easy to learn *The Idea Processor* commands; in fact, most new users master them in an afternoon. This is because the program makes full use of the IBM keyboard and its special function keys. For convenience, commands are reviewed on a single unobtrusive prompt line at the bottom of the screen. A single keystroke changes this command review so you can check any of 34 commands in a second or two. In addition, a Help key displays whatever explanation you request. A convenient reference card lists commands by category, and the comprehensive index in this manual makes it easy to find whatever information you need.

The Idea Processor configures the margins, line spacing, pagination, and related features of a printed file by using a simple print format menu and printer codes. The format menu sets top, bottom, left, and right margins, line spacing, and a justified or ragged right margin; printer codes create page breaks and headers and footers, and involve other features such as automatic footnoting and automatic counters.

Because the program does not format text on the screen as you type what you enter appears 80 columns wide, single spaced, with ragged right margin. But you don't have to print a file on paper to see what it looks like; the print-on-screen option lets you preview any page or the entire file.

The Cardfile

Now to the Cardfile. This part of the program is menu-driven; that is, you select commands from a screen display.

The Cardfile doesn't care where you get your information. It can come from scribbled notes, files transferred from an on-line database, old text files, or your imagination. But once you have something to work with, the Cardfile puts it in order.

You type or transfer information onto "cards," storing each card in a "drawer." The capacity of a drawer depends on available disk space and memory; a drawer might contain a dozen, several hundred, or a thousand cards. The drawer is, in turn, stored in a "cabinet" which can hold up to eight drawers. Drawers are interchangeable among cabinets.

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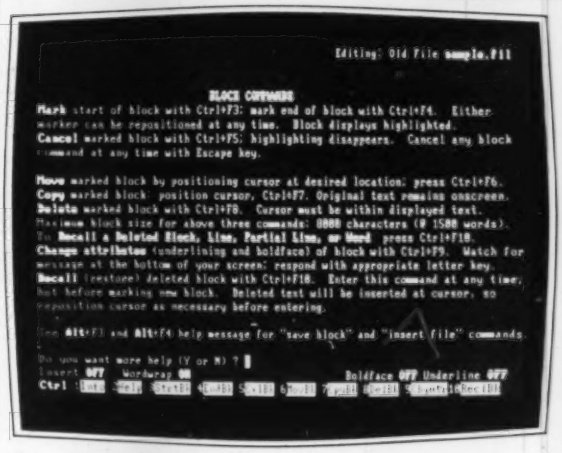
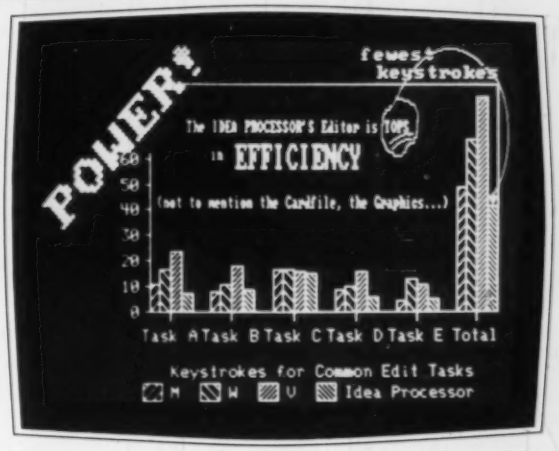

Editing: Old File sample.fil
BLOCK COMMANDS
Mark start of block with Ctrl+F3; mark end of block with Ctrl+F4. Either marker can be repositioned at any time. Block displays highlighted.
Cancel marked block with Ctrl+F5; highlighting disappears. Cancel any block command at any time with Escape key.
Move marked block by positioning cursor at desired location; press Ctrl+F6.
Copy marked block: position cursor, Ctrl+F7. Original text remains onscreen.
Delete marked block with Ctrl+F8. Cursor must be within displayed text.
Maximum block size for above three commands: 8000 characters (@ 1500 words).
To Recall a Deleted Block, Line, Partial Line, or Word: press Ctrl+F10.
Change attributes (underlining and boldface) of block with Ctrl+F9. Watch for message at the bottom of your screen; respond with appropriate letter key.
Recall (restore) deleted block with Ctrl+F10. Enter this command at any time; but before marking new block. Deleted text will be inserted at cursor; so reposition cursor as necessary before entering.
See Alt+F3 and Alt+F4 help message for "save block" and "insert file" commands.
Do you want more help (Y or N) ?
Insert OFF Wordwrap ON
Boldface OFF Underline OFF
Ctrl

One of the 19 Help screens.



This graph was drawn with 1-2-3, then captured by the Idea Processor SAVESCRN function and embellished with the Sketchpad program from the Idea Ware Grafix Idea system.

When you store a card in a drawer, you index the card with one or more keywords. Later, you use its keyword(s) to retrieve the card.

The fun begins when you use the whole *Idea Processor*. Imagine that you are typing a report, using the Editor. You need a fact stored in the Cardfile. A single command switches you to the Cardfile, where you select the Fetch Card command and type an appropriate keyword. While working in a cabinet, you have access to all the cards stored in all its drawers, and you can review the keywords found in that cabinet at any time.

When you fetch a card using a keyword, the first card indexed with that keyword appears, along with a notation showing how many cards in the cabinet share that keyword. For example, "1 of 14" tells you that this is the first of 14 cards having the same keyword.

You can look through all the cards in the series, or you can specify a set of keywords with the "and/or/not" option. For example, if you enter the set "apple or banana and orange not chocolate," the screen will display only cards indexed with apple and orange or with banana and orange, none of which are indexed with chocolate.

Once you display the card you want to use in your report, you press a single key to return to the edit screen. Press another command and your card appears

The Grafix Idea

Create Your Own Slide Show

The Grafix Idea from Idea Ware allows users of IBM-compatible personal computers, including the PCjr to create visual aids. The program allows the user to make drawings, titles, graphs, and pictures, and to compose, create, and edit on-screen slide shows to illustrate presentations.

The slide show may contain not only graphics images, but images of text screens such as spreadsheets. Screen images may be sent to a printer to produce hardcopy for handouts or overhead transparencies.

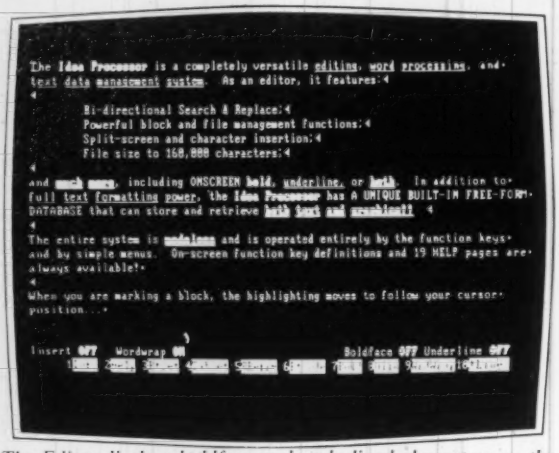
The system includes a program that allows the user to save a screen image created by any other program in a form that is compatible with the sketch and slide show facilities. Thus a user who creates graphs with *Lotus 1-2-3, VisiPlot, dGraph*, or other graphics programs, can retrieve and show these graphs as part of a speech or presentation. He may also use the on-screen sketchpad capability of *The Grafix Idea* to add labels, titles, or drawings, to these images, and to change their colors.

In addition to comprehensive labeling and titling capabilities, the sketchpad can draw pictures, flowcharts, and illustrations in bright colors. Built-in commands include Arc, Box, Line (of nine widths), Circle, and Dot. Areas of the screen (up to a full screen in size) may be erased, copied, moved, saved into a library of images, and moved between pictures.

Color options include changing the background color, changing the color of drawn objects, and filling a chosen area with a single color. Text can be put on the screen in three sizes, eight orientations, and numerous colors. Special effects such as shadowed or outlined text are easy to achieve. The drawing capabilities are controlled by cursor movements managed from the keyboard.

The Grafix Idea may also be used in conjunction with *The Idea Processor*. When the two systems are used together, they make possible the editing of both text and graphics images from within a single program environment. The suggested retail price of the program is $79.95.

CIRCLE 430 ON READER SERVICE CARD


The Idea Processor is a completely versatile editing, word processing, and text data management system. As an editor, it features:
Bi-directional Search & Replace:
Powerful block and file management functions:
Split-screen and character insertion:
File size to 160,000 characters:
and much more, including ONSCREEN bold, underline, or both. In addition to full text formatting power, the Idea Processor has A UNIQUE BUILT-IN FREE-FORM DATABASE that can store and retrieve both text and graphics!!
The entire system is modeless and is operated entirely by the function keys and by simple menus. On-screen function key definitions and 19 HELP pages are always available!
When you are marking a block, the highlighting moves to follow your cursor position...
Insert OFF Wordwrap ON Boldface OFF Underline OFF

The Editor displays boldface and underlined characters on the screen as they will appear when printed. The Info line at the bottom can be cycled through the definitions of all 40 function keys.

Cabinet Open: b:softcon
List from keyword:
List to keyword:
Card File Menu
accountant analyst author baker benefit
bload bsave butcher candlestick card
cardfile commands consultants doctor engineer
financial format graphics how idp
lawyer librarian needs programmer scholar
scientist structure student teacher tech_writer
who you
Fetch card Make card Drawer utility Cabinet utility Return
Drawers

The key to the power of the Idea Processor is the Cardfile database that is built right into the Editor. Here we see the keywords in Cabinet b:softcon displayed, with the Cardfile menu at the bottom.

in your report. You can use the card as is or change it with edit commands.

The program is very flexible. You can transfer blocks of text from Editor to Cardfile for storage as cards. You can fetch a card but change it before bringing it into your report. You can revise any card at any time. And you can add, erase, or change the keywords of any card. One of the most exciting features of *The Idea Processor* is its ability to store screen images generated by other programs. For example, if you create a spreadsheet or illustration with a program like *1-2-3, VisiPlot,* or *dGraph II,* you can save the screen display and store it on a card. Then whenever you want to use the illustration, you simply fetch its card and move it into your report. Once an illustrated card is in your Cardfile, you or anyone working with your computer can use that graph, financial statement, or picture without having to refer to the software that created it.

The designers of *The Idea Processor* claim that once you type something on a card, you never have to type it again,

The Letter Writer

An Idea Source for The Idea Processor

William Usim

IdeaWare, Inc. has prepared a text database disk called *The Letter Writer* for use with *The Idea Processor. The Letter Writer* is a source of material that can be used as is or modified to suit each individual's requirements. The material is organized to take advantage of the cardfile capability of *The Idea Processor.*

The disk contains two cabinets: Letters which has Letters and Titles drawers, and Address containing Address and Agency drawers. The material of primary interest is in the Letters drawer of the Letters cabinet and consists of about 100 letters. Some of these are complete letters; others are model letters that can be used as guides in preparing your own. The subjects covered include complaint, condolence, job applications, and invitations, to name just a few. One of the cards in the drawer contains instructions extracted from the manual, a handy reference while using the disk.

The second drawer in the Letters cabinet, Titles, has the correct forms for addressing diplomats, clergymen, military people, professional people, and government officials.

The Address cabinet is devoted to a collection of addresses. These cover a wide range of agencies, federal and local. Using the editing capability of *The Idea Processor*, you can extract those addresses that may be useful to you and then add your own for a readily available address database.

In both cabinets the cards are preindexed with keywords that make locating appropriate material fairly easy. Each card is indexed under several keywords. As an example, if I were interested in writing a letter requesting information on a new product (maybe *The Idea Processor*) I would fetch cards under keywords inquiry or business. Then I would scan the cards that were retrieved to find the letter that appears in Figure 1.

That letter is marked as a block while in the Cardfile, moved to the Editor, then edited to cover the item of interest. If the business address is available on a card, that can also be brought to the document file and merged into the text. The letter now appears as in Figure 2.

The letter is now ready to be printed and mailed. This very simple letter shows how *The Letter Writer* can be used. There are many more complex model letters on the disk.

System Saver® didn't become the Apple's number one selling* peripheral by being just a fan.

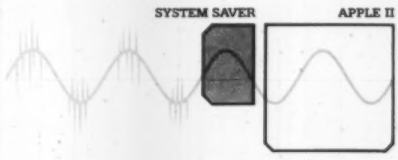
What made over 100,000 Apple® owners fall in love with System Saver? The answer is simple. It's the most versatile, most convenient, most useful peripheral ever made for the Apple.

System Saver filters out damaging AC line noise and power surges.

70-90% of all microcomputer malfunctions can be traced to power line problems.** Problems your System Saver guards against.

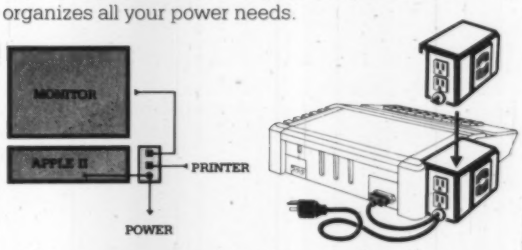
Power line noise can often be interpreted as data. This confuses your computer and produces system errors. Power surges and spikes can cause severe damage to your Apple's delicate circuitry and lead to costly servicing.

System Saver clips surges and spikes at a 130 Volts RMS/175 Volts dc level. A PI type filter attenuates common and transverse mode noise by a minimum of 30 dB from 600 kHz to 20 mHz with a maximum attenuation of 50 dB. You end up with an Apple that's more accurate, more efficient and more reliable.



System Saver makes your Apple more convenient to use.

No more reaching around to the back of your Apple to turn it on. No more fumbling for outlets and cords to plug in your monitor and printer. System Saver organizes all your power needs.

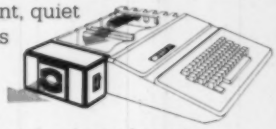


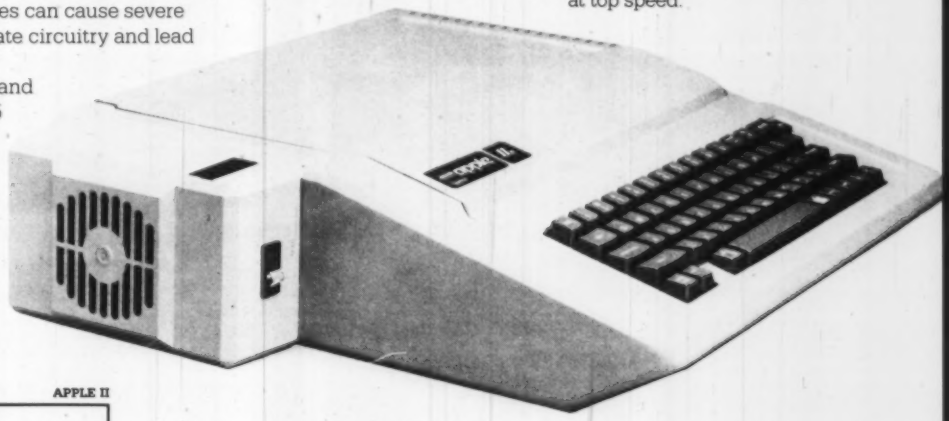
It functions as a multi-outlet power strip with two switched outlets. Plus System Saver offers the ultimate convenience; a front mounted power switch for fingertip control of your entire system.

System Saver lets your Apple keep its cool.

Today's advanced peripheral cards generate heat. In addition, the cards block any natural air flow through the Apple IIe creating high temperature conditions that shorten the life of the Apple and peripheral cards.

System Saver's efficient, quiet fan draws fresh air across the mother board, over the power supply and out the side ventilation slots. It leaves your Apple cool, calm and running at top speed.





So if you want to keep damaging heat, line noise and power surges out of your system for good, pick up the only peripheral that's in use every second your computer is in use. The System Saver. You'll soon come to think of it as the piece Apple forgot.

Compatible with Apple stand

Please send _____SYSTEM SAVER(S), $89.95 each. Total $_____

Include $2.50 for shipping and handling.
New York State residents add applicable sales tax.

☐ Check enclosed ☐ Visa ☐ Master Card

Card No. _____ Expires _____

Name on Card _____

Name _____

Address (UPS delivery) _____

City _____ State _____ Zip _____ Phone _____

251 Park Avenue South
New York, NY 10010
(212) 475-5200 Tlx 467383 KML NY

KENSINGTON™ MICROWARE

*Softsel Computer Products Hot List. **PC Magazine. March 1983

System Saver is UL Listed. System Saver's surge suppression circuitry conforms to IEEE specification 507 1980, Category A. Available in 220/240 Volts, 50/60 Hz.

System Saver is a registered trademark of Kensington Microware Ltd.
© 1983 Kensington Microware Ltd. System Saver is patent pending.

CIRCLE 170 ON READER SERVICE CARD

SOFTWARE PROFILE

Name: The Idea Processor

Type: Word processor/card file/ data manager

System: IBM PC and compatibles

Format: Disk

Language: Machine

Summary: Powerful, versatile, many unique features, easy to learn, creative writing tool.

Price: $295

Manufacturer:
Idea Ware, Inc.
225 Lafayette Street #712
New York, NY 10012
(212) 334-8043
(800) 221-7798

and that is not an exaggeration. If the card you want is indexed with a five-letter keyword, it takes only ten keystrokes to move from Editor to Cardfile, enter the Fetch Card command, type the keyword, display the card, return to the Editor, and insert the card into your report.

As though these features weren't sufficiently timesaving, *The Idea Processor* offers another convenience that once experienced is hard to live without: the keyboard macro. At any time, you can define a keyboard macro as any sequence of keystrokes (letters, numbers, edit commands, etc.), up to 100 keystrokes in length. Then whenever you need that sequence, you type a single key and it repeats automatically.

Occasionally, someone devises a test to measure the efficiency of different word processing programs. In a recent issue of *PC World,* Burton Alperson compared three popular programs by counting the keystrokes each required to edit a simple document. *WordStar* used 275 separate keystrokes, *VisiWord* 326, and *Microsoft Word* 149. Writer Tim Knowlton read Alperson's report and tried the same exercise using *The Idea Processor;* he used only 131 keystrokes. If the efficiency of a program can be judged by the number of keystrokes necessary to complete an editing project, *The Idea Processor* has a significant edge on its competition.

Documentation

The manual for *The Idea Processor* is well organized, thoroughly indexed, and easy to understand. It includes an overview of the program, descriptions of individual commands, step-by-step lessons, expert techniques, an appendix of IBM DOS commands, a glossary of computer terms, and a reference section.

Three disks come with the package: the program disk, a self-running demonstration, and a disk of lesson files. The self-running demonstration produces a slide show of the various features of the program. All you have to do is watch. On the lesson disk, several files are interactive tutorial exercises; you follow the instructions on the screen and enter commands yourself using the program to complete simple exercises. This disk also contains files for your use as you work through the tutorial section of the manual.

Once an illustrated card is in your Cardfile, you can use that graph, financial statement, or picture without having to refer to the software that created it.

The Idea Processor is an exciting, unique, and versatile program. It is an important breakthrough in text preparation and editing, ideal for office and academic use, computer program writing, manuscript preparation, and research.

Finally its price is a pleasant surprise, only $295 or about half of what most experts guess when they see what the program does. EN

CIRCLE 405 ON READER SERVICE CARD

When you write a letter that you might use again, it can be saved as a card to build your own database of letters.

Since the *Letter Writer* disk is full, the cabinets should be copied to separate backup disks before you use them. A well written 27-page manual accompanies the disk. It contains helpful information on the use of *The Letter Writer* in conjunction with *The Idea Processor.*

In summary, *The Letter Writer* is a useful collection of reference material and ideas for writing letters covering a variety of subjects.

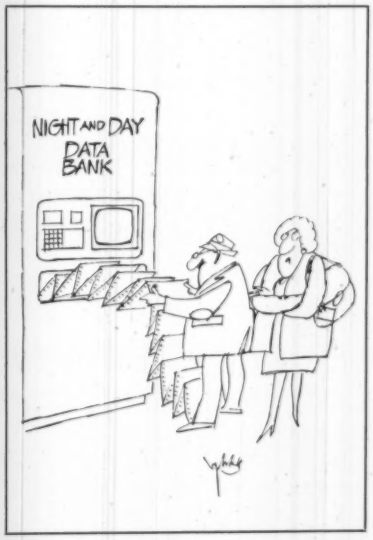
The Letter Writer retails for $59.95. EN

```
Gentlemen:        or: Dear Sirs,    or: Dear Mr. or Ms. Name,

Please send a copy of your current catalog, wholesale price list,
and credit terms.  I am (or: we are) especially interested in your
(name of item).

Sincerely,
```

Figure 1.

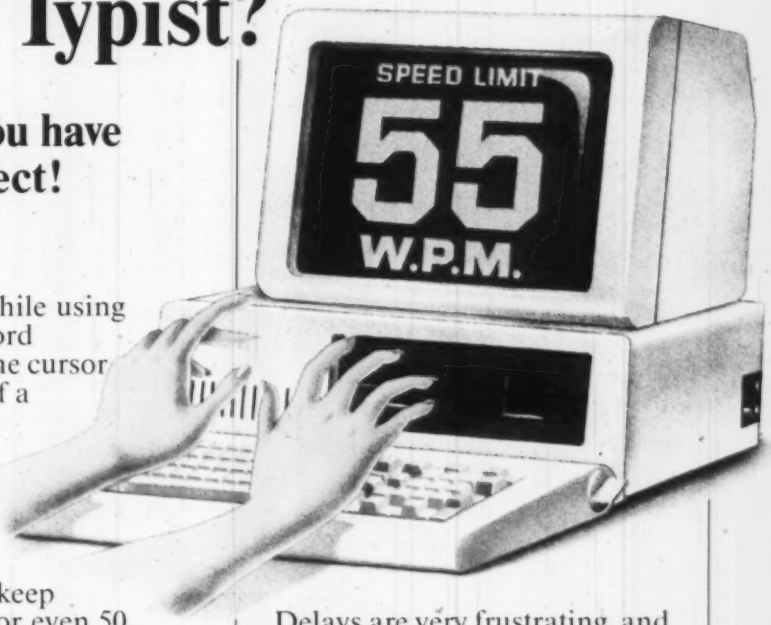
```
IdeaWare, Inc.
225 Lafayette St.
New York, N.Y. 10012

Gentlemen:

Please send me a copy of your current catalog, retail price list,
and credit terms.  I am especially interested in your program The
Idea Processor.

Sincerely,
```

Figure 2.



Can Your Word Processor Keep Up With Your 100 WPM Typist?

It can if you have WordPerfect!



Try this test. While using your favorite word processor, put the cursor in the middle of a paragraph, turn insert on, and type. Surprisingly, very few of the leading word processors can keep up with 70, 60, or even 50 words per minute. WordPerfect keeps up easily at speeds well above 100*.

Now, maybe this doesn't matter to you, because you don't type 100 or even 50 WPM. But you still don't want to wait forever to go to the beginning of your document, go to page 5, save your document, or add a paragraph.

At SSI anything less than fast is unacceptable. And not just because time is money, or because wasting time is foolish.

Delays are very frustrating, and frustration can easily lower the quality of your writing.

Try WordPerfect.

WordPerfect

You'll love it—not only for the features we've built in, but also for the delays we left out.

*Based on tests performed on an IBM PC.

SATELLITE SOFTWARE INTERNATIONAL

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SSI

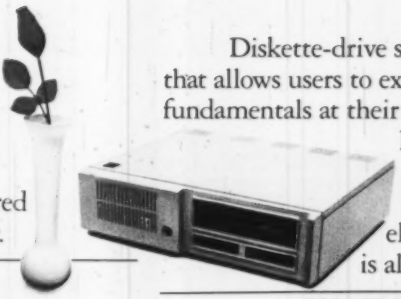
CIRCLE 164 ON READER SERVICE CARD

WITH IBM PC AT THE OFFICE AND PC*jr* AT YOUR HOUSE, YOU CAN TAKE WORK HOME ON YOUR LITTLE FINGER.

Many business people already know about the IBM® Personal Computer family.

Many are now hearing about its new member, the IBM PC*jr*.

And some have already discovered how PC and PC*jr* can work together.



THE JOY OF PERSONAL COMMUTING

PC*jr* bears a strong resemblance to the rest of the family.

If you know how to operate PC or PC/XT, you can operate PC*jr* easily. If you have programs for PC or PC/XT, you'll find many of them will run on PC*jr*.

Now, much of what you start at the office, you can finish at home, and vice versa.

And while you're at the office, your family will find plenty to do with PC*jr*.

THE BRIGHT LITTLE FAMILY ADDITION THAT CAN GROW UP FAST

PC*jr* is a powerful tool for modern times. With easy-to-follow new IBM Personal Computer programs, and with options like a printer and an internal modem for telecommunications, it can handle a great variety of jobs.

Children can learn new ways of learning, and make short work of homework. Adults can keep track of household expenses, write letters, file tax data, plug into information networks. And everyone can enjoy challenging new cartridge games.

IBM designed PC*jr* with lots of bright ideas to make computing easier.

The "Freeboard"—a keyboard that doesn't need a connecting cord—is easy to get comfortable with.

Built-in picture instructions can help the first-time user get started.

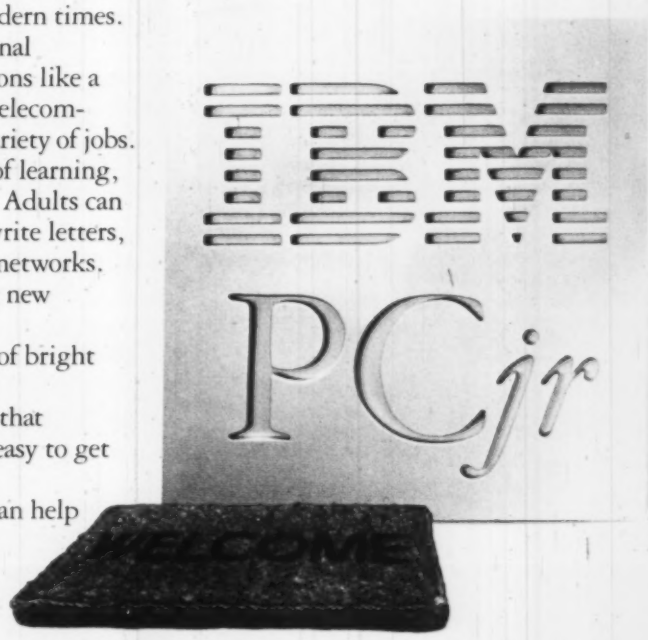
Diskette-drive systems include a program that allows users to explore computer fundamentals at their own pace. And to get PC*jr* up and running from the very first day, a sample diskette with eleven useful mini-programs is also included.

HOME ECONOMICS: IBM DISKETTE COMPUTING FOR ABOUT $1300

PC*jr* is the most affordable of the IBM personal computers.

A diskette-drive model with a 128KB user memory is about $1300. An expandable 64KB cassette/cartridge model is about $700. (Prices apply at IBM Product Centers. Prices may vary at other stores.)

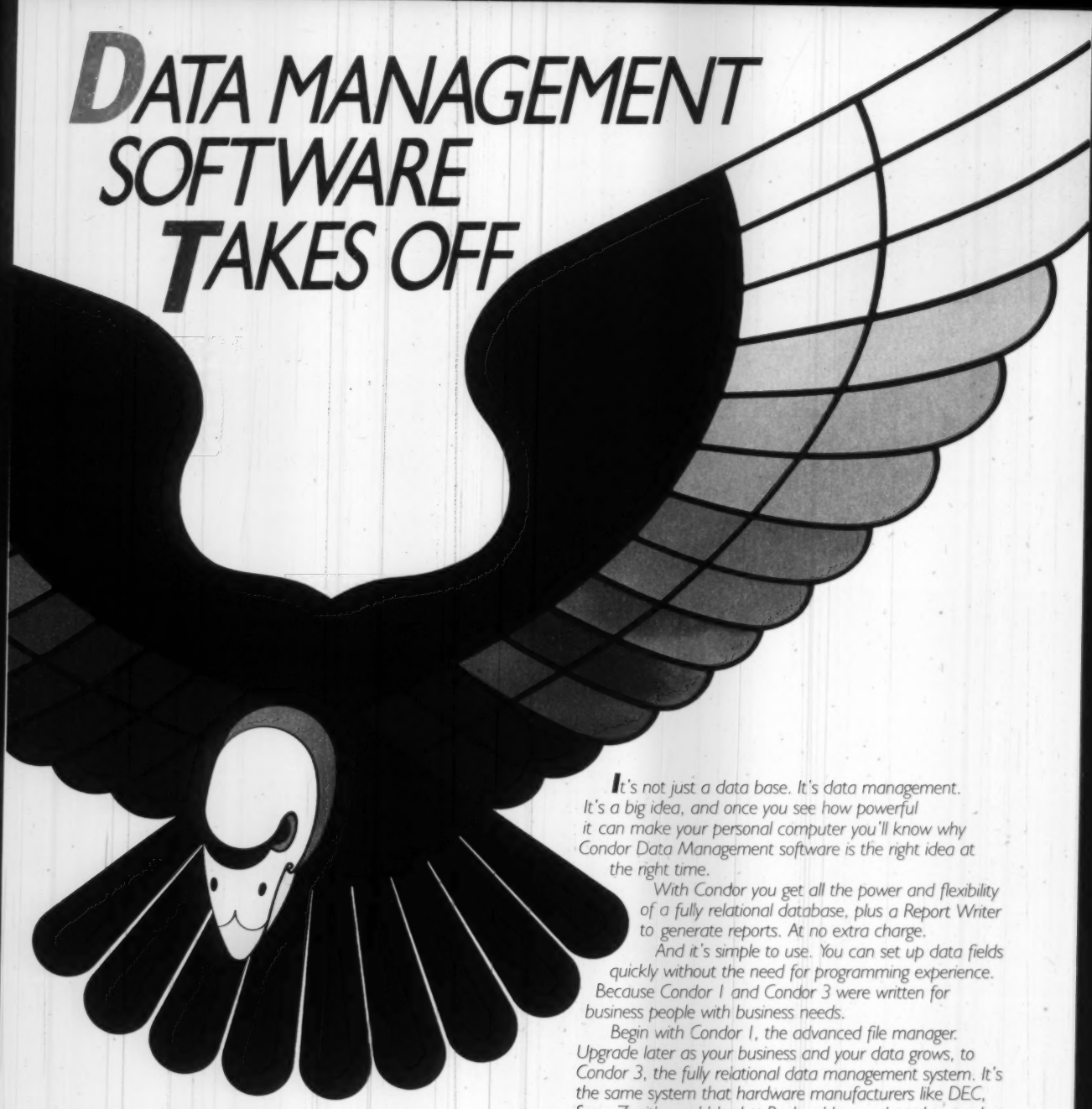
For a demonstration, visit an authorized IBM PC*jr* dealer or an IBM Product Center. And you can find the store nearest you with your little finger. Just dial 1-800-IBM-PCJR. In Alaska and Hawaii, 1-800-447-0890.



Little Tramp character licensed by Bubbles Inc., s.a.

CIRCLE 134 ON READER SERVICE CARD

DATA MANAGEMENT SOFTWARE TAKES OFF



It's not just a data base. It's data management. It's a big idea, and once you see how powerful it can make your personal computer you'll know why Condor Data Management software is the right idea at the right time.

With Condor you get all the power and flexibility of a fully relational database, plus a Report Writer to generate reports. At no extra charge.

And it's simple to use. You can set up data fields quickly without the need for programming experience. Because Condor 1 and Condor 3 were written for business people with business needs.

Begin with Condor 1, the advanced file manager. Upgrade later as your business and your data grows, to Condor 3, the fully relational data management system. It's the same system that hardware manufacturers like DEC, Sony, Zenith, and Hewlett-Packard have selected to market with their personal computers.

To find out how Condor Data Management software can make your business take off, see your personal computer dealer, or call 1-800-854-7100 x165 (in California, 1-800-422-4241 x165) for the dealer nearest you.

He'll prove our point. That Condor is the data management software powerful enough to be useful to business, yet simple enough for business to use.

condor

2051 South State St., Ann Arbor, MI 48104 313/769-3988

CIRCLE 246 ON READER SERVICE CARD

TermExec

Smart Terminal Communications For Apple

Steve Arrants

Your friend has written a TRS-80 program that you want to adapt for the Apple. It is quite long—more than 300 lines. So you spend a Saturday afternoon painstakingly entering the whole program by hand, editing as you enter.

Your favorite science fiction author (a bit of a recluse) will be on CompuServe answering questions and chatting with other users. You would like to get a copy of his remarks and edit out stray comments and extraneous dialog.

With *Term Exec* from Exec Software Inc., both of those tasks can be accomplished quickly and easily. *TermExec* is a communications program designed to turn your Apple and a modem into an intelligent terminal. It requires a 48K Apple II+ or IIe, a single disk drive, and any of a number of popular modems. With *TermExec* you can talk to another Apple, another computer, or a time-sharing service such as The Source, CompuServe, or Delphi.

Documentation

The documentation is provided in a three-ring binder. It is 110 pages long and consists of an introduction that explains the features of *TermExec;* a tutorial; and expanded sections on macro commands, setting up profiles, using the editor, and other commands.

The manual is written for the first time user and may seem elementary in some spots for communications veterans. By the time you have bought the modem, serial card and software, you should know what baud rate is. However, given the choice between too little and too much documentation, I always choose the latter. An index is missing, but it should be available in a newly rewritten manual with the next update.

TermExec is not copy-protected, and Exec Software recommends making backups. The programs are listable and can be modified by the user.

Using TermExec

After booting your back-up disk, the screen displays " . . . Thanks. For HELP, type ESC-?" and the action prompt TX>. *TermExec* is not menu-driven. You simply enter any *TermExec* or DOS command for action. Entering a question mark followed by RETURN produces a list of all the commands with a short explanation of each. For more extensive help, enter a command followed by a question mark. For example, LIST? would display:

```
LIST (APPLE FILE NAME)
LIST
```

SOFTWARE PROFILE

Name: TermExec

Type: Smart terminal

System: 48K Apple, Franklin Ace

Format: Disk

Summary: Very easy to use. An excellent package.

Price: $79.95

Manufacturer:
Exec Software
201 Waltham St.
Lexington, MA 02173
(617) 862-3170

prompting you for further information before it can process your command.

TermExec performs self-initialization on booting. It will search through the Apple to determine where the modem and printer are located, whether you are using an Apple II+ or IIe, if an 80-column card is present, and if the shift-key modification has been made. You can call up the local profile to change any information if you have two printers connected.

Dialing up a remote computer is very easy. Enter TERMINAL and the number at the next prompt. This version of *TermExec* supports auto-dialing only with a Hayes Smartmodem. You must dial manually if you use other equipment.

Once connected to the remote host, you can save, send, list, or issue any DOS command by hitting ESC-!. This puts you back in the command mode without disconnecting your Apple from the host. Concurrent printing is available by entering ESC-#.

File Handling

TermExec works only with Apple text files. This may seem like a limitation but you can use a conversion program to change a text file to binary, Applesoft, or Integer. Actually, working solely with text files makes sense. After receiving a file you will need to do some editing. EXECing the file will place it into memory where it can be saved as a binary, Applesoft, or Integer file. You can also convert a file to text for transmission.

To transmit a file to a remote host enter ESC-! SEND file name. The file is loaded from disk and sent to the host. Enter a RETURN to get back into the terminal mode.

Some hosts require a special transmission protocol called XMODEM or Christianson Protocol. This provides a

OUR AD #C5

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HARDWARE for your APPLE

APPLE IIe, 128K, 80 COLUMN — CALL
APPLE IIe, STARTER SYSTEM BY APPLE — CALL

APPLE MACINTOSH — CALL
LIMITED WARRANTY is 100% Parts & Labor for 90 days by us.

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AMDEK	Amdisk I, 3" Micro-Floppy, 143K	$ 299	$ 249
★ CENTRAL PT.,	Filer, Utility & Apple DOS	$ 20	$ 15
μ-SCI MICRO-SCI	★ A2, 143K Disk Drive	$ 479	$ 229
	A2 Controller Card	$ 100	$ 79
	★ A40, 160K, Drive	$ 449	$ 299
	★ A70, 286K, Drive	$ 599	$ 299
	A40 A70 Controller	$ 100	$ 79
1/2 HIGH DRIVES	ALPS, A40, Belt Drive, 163K	$ 299	$ 199
	TEAC, T40, Direct Drive, 163K	$ 349	$ 219
	TEAC, T80, Double Sided, 326K	$ 449	$ 329
	Controller Card by ComX	$ 110	$ 59
Rana	Elite 1, 163K, 40 Track	$ 379	$ 259
	Elite 2, 326K, 80 Track	$ 649	$ 429
	Elite 3, 652K, 160 Track	$ 849	$ 539
	Elite Controller	$ 145	$ 89

RAM EXPANSION

★ ALS,	ADD Ram (II+)	16K	$ 100	$ 49
★ ComX,	80 col. +64K RAM for IIe, 1 Yr Wty		$ 199	$ 99
★	RAM Card, 1 Yr. Wty. (II+)	16K	$ 179	$ 39
★ Microsoft,	RAM Card (II+)	16K	$ 100	$ 69
★ Titan/Saturn	RAM Card (II+)	32K	$ 249	$ 169
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★ ALS,	Smarterm II(+ or e)	SPECIAL	$ 179	$ 129
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★ Videx,	VideoTerm 80 col. (+ or e)		$ 279	$ 189
★	UltraTerm (+ or e)		$ 379	$ 279
	Soft Video Switch (II+)		$ 35	$ 25
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We Have Full Videx Line. Call. *Up to 35% off.*

MISCELLANEOUS

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	Z-Card (+ or e)	$ 169	$ 109
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★ CCS,	Serial Interface 7710 (Set BAUD)	$ 150	$ 99
Chalkboard,	Power Pad	$ 100	$ 75
Eastside,	Wild Card (copier, II+ only)	$ 110	$ 85
	Wild Card 2 (copier, + or e)	$ 140	$ 99
Kensington,	System Saver	$ 90	$ 65
Key Tronic,	KB200 keyboard (II+)	$ 298	$ 219
Koala,	Touch Tablet w/Micro Illustrator	$ 125	$ 85
Kraft,	Joystick (Ap II/II+)	$ 65	$ 49
	Paddle(Ap II/II+)	$ 50	$ 39
M&R,	Sup R fan (+ or e)	$ 50	$ 39
★ Microsoft,	Z80 Softcard (+ or e)	$ 345	$ 345
★	Z80 Softcard Plus (+ or e)	$ 465	$ 465
★	Z80 Softcard Premium(II+)	$ 695	$ 479
★	Z80 Softcard Premium(IIe)	$ 495	$ 339
MicroTek,	Dumpling 64, Buffer	$ 349	$ 269
★ Orange Micro,	Grappler Plus (e or +)	$ 175	$ 119
	16K Buffer Board for Grappler Plus	$ 175	$ 119
	Buffered Grappler Plus, 16K	$ 245	$ 179
Paymar,	Lower Case Chip, Rev. 7 (II+)	$ 50	$ 39
★ PCPI,	AppliCard, 14 features 6Mhz	$ 375	$ 275
RH Electronics,	Super Fan II	$ 75	$ 59
★ Titan/Saturn,	Accelerator II	$ 599	$ 449
Transend/SSM,	AIOII, Serial/Para I/F	$ 225	$ 169
TG Products,	Game Paddles (II+)	$ 40	$ 29
	Joystick (II+)	$ 60	$ 45
Videx,	PSIO I/F Card	$ 229	$ 169
WICO,	Mouse, Complete	$ 179	$ 119

SOFTWARE for your APPLE

BUSINESS

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Artsci,	Magic Window II	$ 150	$ 99
	Magic Combo(Wind,Mail&Words)	$ 225	$ 149
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	Friday (Requires CP/M 80)	$ 295	$ 199
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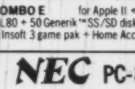

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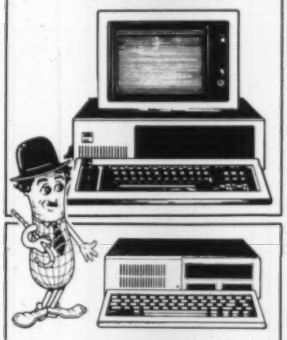

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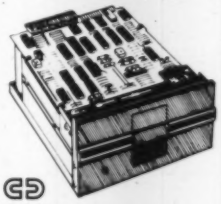

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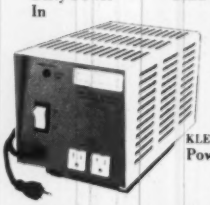

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mechanism for file-to-file transfer between two Apples or between an Apple and a remote host with built-in error checking to assure that line noise is not introduced into the file. XMODEM protocol is used primarily by CP/M bulletin boards.

In the time that I have used *TermExec* I have not lost a single file due to the software. It has always performed as expected.

The Editor

The weakest link in *TermExec* is the built-in editor. It is adequate for simple editing in a pinch, but I prefer to use *AppleWriter* for more complex editing.

The editor works as stated in the documentation, but the command structure is confusing. Better documentation would definitely help with this section. I expected to find a help section similar to that in the main program. The only help you will find is in the manual.

Extra Features

Among the most useful features of *TermExec* are macros. You can have one or a string of characters represent other commands. If you use a timesharing system such as CompuServe, macros can simplify sign-on and speed up access to the different areas of the system. Macros may be saved as special files that can be loaded at any time.

In the time that I have used TermExec I have not lost a single file due to the software.

Exec Software provides a feature that other terminal software publishers do not. If you are having trouble with the package, need help with a special macro, or want to suggest additional features, they provide a BBS for users and the public. You can exchange information with other users, trade equipment, learn about new macros, and even download special programs that enhance *TermExec*.

Purchasers of *TermExec* also receive free membership in Delphi, a timesharing service.

Conclusion

With the exception of its editor, *TermExec* is a well designed communications package that offers more features and versatility than some other packages. Its ease of use, friendliness, and the support offered by Exec Software make it an outstanding value. END

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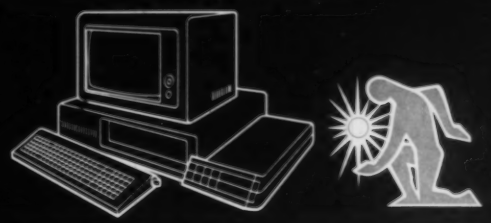

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CHOOSING & USING ELECTRONIC SPREADSHEETS

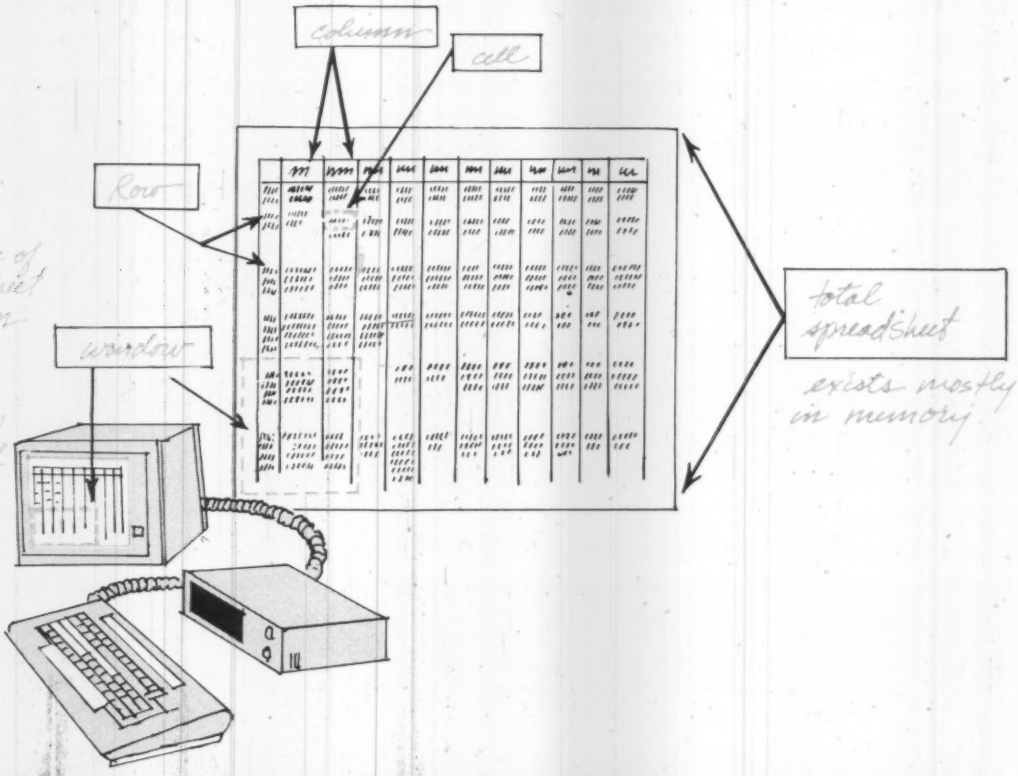
What is a Spreadsheet?

How to Buy an Electronic Spreadsheet

Spreadsheet Comparison Chart

Templates, Enhancements, and Instructional Materials

What is a Spreadsheet?



Many people believe that electronic spreadsheets are nothing more than simple calculators. Add the fact that many of them carry the word "calc" somewhere within their names, and you can understand some of the confusion.

However, electronic spreadsheets are much more than calculators. They are versatile tools for processing many numbers in a small amount of time. To draw an analogy, a spreadsheet manipulates numbers the way a word processor manipulates words.

Like conventional pencil-and-paper worksheets, electronic spreadsheets organize data in a matrix of rows and columns. Frequently, the rows contain various formulas (calculations to be performed on the data which are entered later) and the columns define periods of time. The rows could just as easily define items in inventory and the columns, various suppliers. Indeed, anything that lends itself to a grid or matrix organization can be manipulated on an electronic spreadsheet.

Each intersection of a row and column forms a cell which holds one piece of information. The cells are linked together by the formulas. If you make a change in one cell, the spreadsheet uses the power of the computer to automatically recalculate and alter every other cell linked to that original cell.

As you can imagine, businesspeople, especially those involved with sales forecasting, budget analysis, and other financial planning, profit the most from the speed of a spreadsheet. They can duplicate a situation, project numerous hypothetical developments, and study the results of "what if" scenarios without error and in less time than it takes to create a single manual worksheet.

Spreadsheets are handy for home applications, too. You can analyze the family budget much faster and easier using an automatic spreadsheet than by entering and reentering numbers on a calculator. You can figure out how various deductions will affect your tax bill. If you hold stocks or bonds, you can estimate profits, losses, dividend income, yield and other aspects of your portfolio. You can also use the same information in a tax planning spreadsheet.

Although it can take considerable time to set up your initial worksheet—laying out the matrix, entering headings and labels, and defining formulas—this template can be saved on disk. Thus, the next time you want to use that application with different data, you need only enter the new data, for the template has already been created. Furthermore, templates for many common problems are available for all of the popular spreadsheet packages.

For business or home, an electronic spreadsheet is an invaluable tool for manipulating numbers. It performs tedious calculations and recalculations without error and far faster than can be done by hand. An electronic spreadsheet offers a practical application for your computer investment. ■

How to Buy an Electronic Spreadsheet

DAVID H. AHL

Although computers have been used for business and financial calculations almost from the day the first Univac was put into service in 1951, the concept of an electronic spreadsheet is fairly new. It did not exist until 1978 when Dan Bricklin, a student at the Harvard Business School sought a better way to perform the endless recalculations of balance sheets, income statements, and forecasts required whenever a single assumption changed. He likened his first microcomputer-based spreadsheet program to "an electronic blackboard and electronic chalk."

The first spreadsheet envisioned by Bricklin had five columns and 20 rows. To make it a marketable product, he enlisted the aid of long-time friend Bob Frankston who increased the number of cells, added some user-friendly features, and packed the resulting program into 20K for the Apple. Dan Fylstra made a deal with Bricklin and Frankston to sell the program, now called *VisiCalc*, through his new company, Personal Software (later renamed VisiCorp as a result of the success of the program).

Bricklin and Frankston formed a company, Software Arts, to develop additional versions of the program for other computers while Fylstra moved his company to the heart of Silicon Valley and acted primarily as a marketer for *VisiCalc* and a growing number of ancillary programs (*VisiTrend*, *VisiPlot*, etc).

Over the years, the two companies have grown apart, and today they are locked in litigation. VisiCorp claims Software Arts was late in delivering *Advanced VisiCalc* because of their emphasis on developing *TK! Solver* while Software Arts faults VisiCorp for emphasizing the newer *VisiOn* product line at the expense of *VisiCalc*.

In any event, today *Advanced VisiCalc* is available from both companies, although VisiCorp has far better distribution. VisiCorp also markets their own *VisiOn* line of integrated software packages while Software Arts markets *TK! Solver*, an iterative problem-solving tool for performing "what if?" calculations.

The astounding success of *VisiCalc* spurred many other software authors and companies to market spreadsheets of their own, some with more features, some for machines not supported by VisiCorp, and some with fewer capabilities that could be sold cheaply in the home market. Today, there are approximately 20 full-featured spreadsheets at prices of $200 and up aimed primarily at business users and 12 or so in the $100 price range aimed primarily at the occasional user or home market. In addition, there are several integrated packages such as *Lotus 1-2-3* which combine a spreadsheet with two or more other functions, usually database and graphics programs.

Features and Functions

With so many spreadsheets on the market and so many claims being made by the various manufacturers, it is easy to become confused. Furthermore, most computer stores handle only two or three packages, and most salespeople are familiar with only one. While charts of features are certainly helpful, you may not need all of the features. Moreover, each feature usually comes at a cost—in dollars, memory, or speed.

In his book, *How To Buy Software*, Alfred Glossbrenner has devised a framework of five categories of spreadsheet features. We have added several to his list and shall use this expanded framework to

How to Buy an Electronic Spreadsheet

discuss the various spreadsheet features so that you can evaluate packages against your particular needs—current and future.

Capacity

As mentioned earlier, the more features a spreadsheet has, the more memory it requires. Very few full-featured spreadsheets run in less than 48K, and the majority require 64K or more. Some of the home packages are smaller, as are the ones for notebook computers. However, because a spreadsheet can run in 48K (or 64K) does not mean that it will meet your needs. For example, if your computer has 64K and the spreadsheet occupies 50K, only 14K will be left for your calculations. This might be enough for a 12-month forecast of 50 items assuming the calculations are not too complicated, but you would be in trouble if you needed 1000 or more cells.

Unfortunately, there is no good way to determine how much memory you need based on the number of cells in a spreadsheet. If you are entering only numbers and labels, you can fit far more data than you can if you are using complicated formulas throughout.

Since 8-bit computers can address only 64K, obviously that is your upper limit in a machine like an Apple; 16-bit machines do not have this restriction. Recognizing the memory problem, some spreadsheets have the ability to use virtual memory, a concept originally devised in the mid-60's which allows a mass storage device to be used as an extension of internal memory.

Thus, with virtual memory, a portion of a spreadsheet can be stored on either a floppy or a hard disk. When you update this part of the spreadsheet, it is automatically brought into RAM and the part you were working on is stored away. With a hard disk, this swapping is reasonably fast, but with a floppy disk it can be agonizingly slow.

Spreadsheet capacity also refers to the maximum number of rows and columns offered by the program. Most spreadsheets offer between 30 and 63 columns. The average number of rows tends to fall between 192 and 254. However, recalling our discussion of memory above, you cannot multiply the maximum rows by columns to get the maximum number of cells; it just doesn't work that way.

Layout and Labeling

Under layout and labeling we group the factors that determine how the final spreadsheet looks. Before selecting a spreadsheet, you should write out by hand or pull from your files some examples of the types of tables or reports you would like to be able to produce.

Do your tables have titles across the top? Some spreadsheets do not permit this because they automatically put spaces between columns. Original *VisiCalc* is an exception; labels can continue from one column to the next without a break.

Do you have long labels on the left with shorter columns of numbers in the body of the table? If so, you want a spreadsheet that permits column widths to be set independently. Nearly all spreadsheets have variable width columns, but some require that all columns be set to the same width.

Are some of your labels actually numbers? Some spreadsheets allow you to use only letters for labels, while others permit the use of both numbers and letters, but not in the same heading. Do you want a spreadsheet that can justify labels to the left or right, center them, or underline them?

What is the format of your numbers? Some spreadsheets automatically insert leading dollar signs, plus or minus signs, credit (CR) and debit (DR) notations, and commas. Some permit scientific notation, integers, or decimal rounding to a specified number of places. Some suppress trailing zeros and display negative numbers in parentheses.

All spreadsheets permit the above cell attributes to be set for an individual cell, and most permit attributes to be specified for a row or column of cells, or even for the entire sheet.

Figure 1. **Monthly profit and loss statement (Multiplan).**

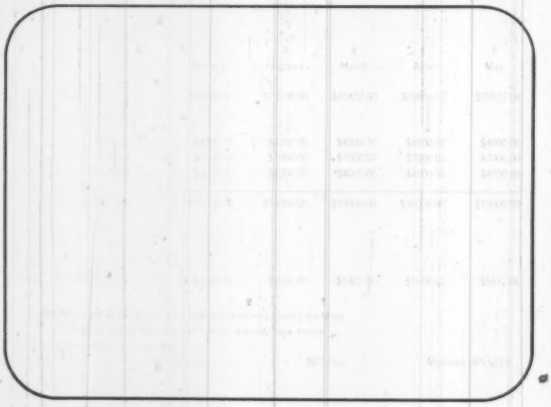
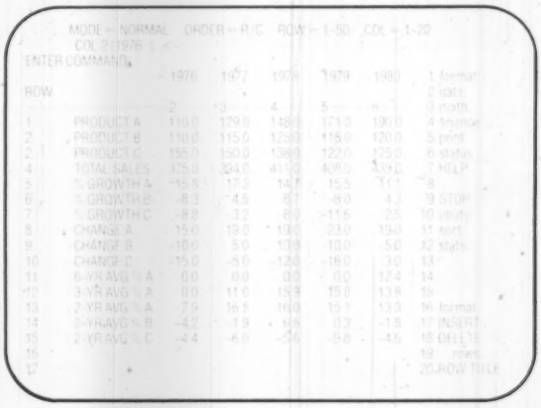


Figure 2. **Annual growth forecast by product (Microplan).**



Many spreadsheets permit a row, a column, or both to be inserted; some permit a row or column to be moved to another location; whereas others permit no insertion or movement at all. The effect on labels of moving rows and columns can be strange. Some packages tidy things up; others leave gaps in text labels.

Formulas and Functions

The power of a spreadsheet lies in its ability to manipulate data automatically according to your directions. However, spreadsheets vary widely in the way they require you to enter these directions.

In the familiar Cartesian coordinate system, the x and y coordinates are both expressed by numbers (e.g., 1,1, or 23,7). So it is with some spreadsheets. Others, however, express cell locations as a letter and number (A1, H45, BC20), while at least one, *Multiplan*, precedes the row and column number with R and C (R1C1, R23C45).

Often when working with formulas you need to use a value from another cell. Generally, you must designate a particular cell using the cell coordinate as described above, but some of the newer spreadsheets permit you to name a cell (Sales, Rate, etc.) and use that name in formulas.

The number of functions available in most spreadsheets today is staggering. All spreadsheets offer the four arithmetic functions, exponentiation, rounding off, and summing a series of cells. Most also calculate absolute value, averages, logarithms, and square roots.

From there on, each spreadsheet designer seems to have taken a slightly different approach. Although most spreadsheets can serve many purposes, their available functions may not suit every user. For example, someone doing financial calculations will find 15 functions in *Microplan* available in no other spreadsheet (discounted cash flow, interest schedule on loan, add constant, percent of total value, and so on).

Someone doing mathematical calculations that require arcsines, aretangents, pi, or modulo will find these functions in *Advanced VisiCalc* and *SuperCalc*, but not in many other packages. For statistical calculations, *Microplan* is attractive with its functions for variance, mean, sigma, moving average, and delta; *Multiplan* has several of these functions also.

Some spreadsheets have conditional and logical operators. Almost all have IF-THEN which means that you can say, for example, "If sales are are over 5000, then use a commission rate of 15%, else use 10%." Conditional operators can also be used to print different labels or text messages. Logical operators can generally be strung together with AND, OR, and NOT, but some spreadsheets offer additional logical operations as well.

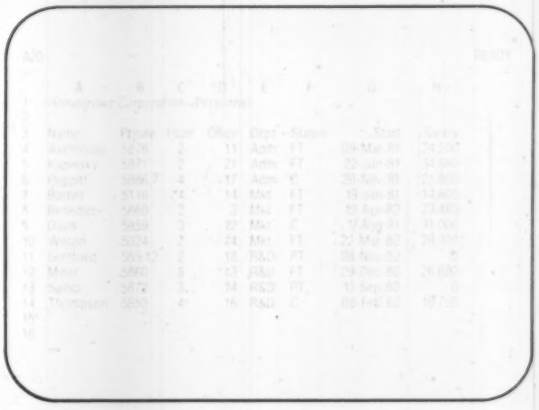
While some formulas contain only a few symbols, others may stretch across the screen. In typing long formulas, it is easy to make mistakes. Some spreadsheets permit you to edit a formula a character at a time while others require that the full formula be retyped. With some packages, you can see the formula for each cell; in others the formulas, once entered, are hidden and can be recovered only by saving the worksheet and looking at the template with a utility or word processing program.

Most spreadsheets have a replicate or copy command that permits cells to be copied from one location to another. Formulas usually can be replicated with constant or relative values. Some spreadsheets even permit an entire block to be replicated or moved from one location to another.

Spreadsheets offer several levels of error protection. First is the ability to use commands such as ON ERROR in which you try to anticipate errors. Second is the option to protect a cell from being changed by accident. This is usually done by putting a marker in a cell in which you do not want the formula or label changed. Numbers can be entered into a marked cell, but labels and formulas cannot be changed until the cell is unprotected.

When all the formulas have been entered, you have constructed a template into which data may be entered. Tem-

Figure 3. **Employee database (Lotus 1-2-3).**



Three spreadsheet applications are illustrated on three spreadsheet packages.

How to Buy an Electronic Spreadsheet

plates for popular applications (monthly P & L statements, forecasts, portfolio analysis, etc.) are often available as commercial packages or printed in magazines and books.

Entering and Viewing Data

In some spreadsheets, every number you type appears immediately in the cell, while other programs have the ability to store a series of keystrokes which are entered upon pressing RETURN. Even more friendly are those spreadsheets that let you press an arrow key both to enter data and to move to the next cell.

Movement around the spreadsheet can be accomplished with the arrow keys (one cell at a time) or with a single command that takes you to a specified cell.

Almost all spreadsheets allow you to look simultaneously at two or more portions of the spreadsheet by means of a window command. Windows can usually be brought in both horizontally or vertically. For most purposes, two windows are enough. However, occasionally you may want to look at a total as well as two other locations. Although *ProCalc* permits six windows and *Multiplan* permits eight, you must ask yourself if you need that many and if they will conveniently fit on your display. In most cases windows scroll independently of one another, however, some packages allow them to scroll together at your option.

The reason for having a spreadsheet is to do repetitive calculations, and each time you enter a new number in a cell, the entire spreadsheet is recalculated. As the sheet gets bigger and more complex, this can be quite time-consuming, particularly since you cannot enter the next number until the recalculation is complete. Thus, a welcome feature in almost all spreadsheets is the ability to turn the automatic calculation function on and off. To enter data speedily, you would turn it off. Then, when you are finished entering data, you can instruct the program to perform all the calculations at once.

Some of the newer spreadsheets employ features from the word processing world such as global search and locate, search and replace, and help menus.

Earlier we mentioned the ability to move rows and columns. An even more advanced feature, found in just a few packages, is the ability to sort and rearrange rows, columns, or both.

All spreadsheets use the "normal" 40-, 64-, or 80-column screen display on your computer. However, if your computer has an alternate text density, say 132 columns, most spreadsheets are able to use this as well. Some packages utilize various other computer display capabilities and employ reverse video, blinking cells, and underlines. A few even take advantage of a color monitor (assuming one is attached) to show negative numbers, labels, and protected cells in different colors. *Multiplan*, for example, provides excellent support of color.

Printing and Formatting

As you would expect, all spreadsheets let you print out your entire worksheet, but there are substantial differences in the ways this is done. In general, you position the cursor over the upper left cell to be printed, call the print routine, specify print parameters, and enter the lower right cell to be printed.

If your spreadsheet is wider than your printer, you must count the characters in each column and then divide the worksheet into the number of rectangles required to print the full width. If it is longer than 56 rows (about what will fit on an 11" piece of paper) you must also divide the vertical printing into segments. A few of the newer spreadsheets (and some add-on software packages) perform this calculation and print your worksheet automatically.

Some packages allow you to send directions to your printer to turn on (and off) a compressed printing mode (assuming it is available on your printer). Two of them, however, *Microplan* and *Magic Worksheet*, limit the horizontal print width to 132 characters even though you might have a compressed mode capable of handling more.

Most newer spreadsheets allow the use of embedded printer commands to produce italics, bold, double strike, and underlining. Some of these packages remember these print options and use them automatically.

Again, some of the newer spreadsheets employ print specifications simi-

lar to those found in word processing packages for such functions as setting margins, single sheet feed, automatic top of form, and page numbering. A few even print row and column titles on each page automatically. Some allow you to dress up the sheet by printing a border automatically.

Microplan offers several unique printing features such as report titles, suppressing zero cells or rows, expressing zero values as dashes, and expressing -0 as -n, n-, or (n).

It is sometimes desirable to get a quick and dirty print of what is on the screen. With computers such as the IBM PC this can be done by pressing PrtSc, but some spreadsheets have this feature built in, too.

The majority of spreadsheets can produce rudimentary bar graphs with asterisks which can, of course, be printed.

Nearly every package allows an image of the worksheet to be saved in text mode on a disk. By so doing, you can access the worksheet with a word processing program; integrate part or all of it into a report; edit it; add titles, dollar signs, percent signs, italics, boldface, superscripts and subscripts; and print it out. This is not a two-way process; you cannot edit the file with the word processing program and read it back into the spreadsheet package.

If you plan to use a word processing program to dress up your worksheets for printing, both programs must be able to read the file. Moreover, your word processor must be able to manipulate lines as long as those in your spreadsheet. This is a crucial limitation since most word processing packages are limited to much shorter line lengths than spreadsheet packages can produce. One spreadsheet, *ProCalc*, incorporates a text processor (actually a UCSD Pascal editor) with the package.

Saving and Loading Files

Most often you will save a worksheet using the normal save command. This saves both the cell formulas and values. Files thus saved can be loaded back in and worked on again. We also mentioned saving a worksheet as a text file, but this is a one-way process used primarily for printing reports. A third method of saving produces files (with the data intact) that can be used by other packages—mainly graphics, database, and communications programs.

VisiCorp was the first to devise such a format, which they called the Data Interchange Format (DIF). By saving a worksheet in the DIF format, the data then can be used by *VisiTrend, VisiPlot, TK! Solver,* and even some competitive spreadsheets, such as *Magicalc*, that use the DIF format.

The DIF format specifies the order in which data are saved in the file. Basically, it first specifies the size of the spreadsheet, the number of columns (vectors) and rows (tuples), and then the values in each cell. Unlike text files, DIF files are two-way; in other words, you can produce data with another program, save the file in the DIF format, and load it into *VisiCalc*. This is especially useful if you want to download data, say statistics from CompuServe or stock prices from Dow Jones, and analyze these data with a spreadsheet.

SuperCalc, Multiplan, ProCalc, and *Microplan* all have their own versions of the DIF format. If you are interested in this capability for graphics or communications, you should examine the related software packages to make sure that they meet your needs.

Some spreadsheet packages such as *Multiplan, PerfectCalc*, and *ProCalc*, have the ability to link several worksheets together so that a change in one is automatically reflected on the others. A related feature is the ability to combine several worksheets into one. This is accomplished in several different ways, some considerably more convenient than others.

While consolidation of two or more worksheets may sound like a wonderful feature, you should ask yourself how often you would actually use it. The simplest way of consolidating worksheets is by using DIF (or similar) files. This is not true consolidation because only the data are saved in the DIF format, not the formulas. Also, if cell locations are duplicated, the new data are saved over the old. Hence, this is simply a way of combining tables of numbers by overwriting.

True consolidation is a complex process, and *Microplan*, with its consolidation module, is one of the few spreadsheets that offers it. There are several add-on software packages that perform true consolidation. *MergeCalc* from Cypher and *Viz.A.Con* from Abacus Associates consolidate *VisiCalc* worksheets, and *Con-Calc* from Sunwest Software does the same thing for *SuperCalc* and other CP/M spreadsheet packages.

Documentation and Help

Naturally, all spreadsheet packages come with a manual that describes the features of the software and how to use them. The majority of the manuals are divided into two major sections, a tutorial and a reference guide. Some also include a quick reference card or chart, and a few, meant for a specific computer, include a keyboard overlay or template.

As we have often commented when reviewing these packages, the quality of the manuals varies greatly. Some seem to be written by programmers for programmers while others, obviously written for rank beginners, force more experienced users to wade through many paragraphs to find the useful nuggets of information. We thought the *Advanced VisiCalc* manual struck just the right balance, but we may be biased, having used regular *VisiCalc* for years.

Moreover, no matter how good the documentation is, it generally will not show how the features can be applied to the problems that are of interest to you. Hence, you should look into other sources of information such as books (there are at least a dozen on using spreadsheets for different applications), self-instruction programs, template programs, magazines, and user groups.

As mentioned earlier, some of the packages have an on-screen help feature or even a separate help menu. A few companies supply an interactive tutorial on a disk that comes with the package.

Some companies have a telephone hot line for customers with questions. This is usually not a free service, and prices for it range up to $50 per hour or more.

(continued on page S-12)

Spreadsheet Comparison

	American Business Systems/**Financial Modeling**	Antech/**Cope**	Business Planning Systems/**Plan 80**	Business Planning Systems/**Plan 86**
CAPACITY				
Minimum memory	64K	128K	56K	128K
Maximum memory	64K	128K	64K	256K
Use virtual memory?	No	Yes	No	No
Max. rows	60	Unlimited	511	511
Max. columns	15	Unlimited	511	511
Max. cells	900	Unlimited	4000	7200
Max. windows	1	2	1	1
LAYOUT AND LABELING				
Variable width columns?	No	No	Yes	Yes
Individually variable widths?	No	No	Yes	Yes
Align data left or right?	Right only	Yes	Yes	Yes
Center label in column?	No	Yes	No	No
Underline or inverse video?	Yes	Yes	Yes	Yes
Leading dollar signs?	Yes	No	Yes	Yes
Minus signs?	Yes	Yes	Yes	Yes
Negative numbers in parentheses?	No	No	Yes	Yes
Credit (CR) and debit (DR) notation?	No	No	No	No
Commas in numbers?	Yes	Yes	Yes	Yes
Protect cells, rows, or columns?	No	Yes	Yes	Yes
FORMULAS AND FUNCTIONS				
Net current value?	Yes	Yes	Yes	Yes
Rate of return?	Yes	Yes	Yes	Yes
Other financial functions?	Amortization	Many	Many	Many
Average?	Yes	Yes	Yes	Yes
Percentage?	Yes	Yes	Yes	Yes
Statistical functions?	No	Many	No	No
Absolute value?	No	Yes	Yes	Yes
Logarithms?	No	Yes	Yes	Yes
Trigonometric functions?	No	Yes	Yes	Yes
Sum?	Yes	Yes	Yes	Yes
Max. and min. value?	Yes	Yes	Yes	Yes
Other arithmetic functions?	No	Many	Many	Many
If-Then operators?	No	Yes	Yes	Yes
Table lookup?	No	Yes	Yes	Yes
Other logical operators?	None	Yes	Yes	Yes
ENTERING INFORMATION				
Replicate rows and columns?	Yes	Yes	Yes	Yes
Replicate blocks?	Yes	Yes	Yes	Yes
Insert rows or columns?	Rows only	Yes	Yes	Yes
Sort rows or columns?	No	No	No	No
Global search and replace?	No	No	Yes	Yes
PRINTING AND FORMATTING				
Print screen contents?	No	Yes	Yes	Yes
Use special printer features?	No	No	No	No
Automatically fit output to paper?	Yes	Yes	Yes	Yes
Page titles or numbering?	Yes	Yes	Yes	Yes
FILE HANDLING				
Interface to other programs?	No	Yes	Yes	Yes
Save worksheet as text file?	No	Yes	Yes	Yes
Link two or more worksheets?	Yes	Yes	Yes	Yes
DOCUMENTATION AND HELP				
On-screen help or tutorial?	No	Yes	Yes	Yes
Demo or tutorial disk included?	No	Yes	Yes	Yes
OTHER FEATURES				
		7 templates included	8 templates included	8 templates included

Chart

	Chang Laboratories/**Microplan**	Comshare Target Software/**Target: Financial Modeling**	Comshare Target Software/**Planner Calc**	Cromemco/**Calcmaster**	Hourglass Systems/**Nova Calc**	Information Unlimited Software/**Easy Planner**	Lotus Development Corp./**Lotus 1-2-3**
	64K	128K	128K	64K	128K	96K	128K
	Unlimited	192K	192K	64K	128K	256K	Ltd. by memory
	No	Yes	Yes	No	No	No	No
	99	5000	5000	30	40	255	2048
	999	999	999	12	20	255	256
	Ltd. by memory	14,000	14,000	360	800	64,925	Ltd. by memory
	1	4	2	1	1	1	2
	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	No	Yes	No	Yes	Yes
	Right only	No	No	No	Yes	No	Right only
	No	No	No	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	No	Underline only	No	Underline only
	No	Yes	Yes	No	No	Yes	Yes
	No	Yes	Yes	No	Yes	Yes	Yes
	No	No	No	No	No	No	No
	No	Yes	Yes	Yes	Yes	No	Yes
	Yes	No	No	No	Yes	No	No
	No	Yes	Yes	No	Yes	Yes	Yes
	Yes	Yes	Yes	No	Yes	No	Yes
	Many	Yes	No	No	Depreciation	No	Many
	Yes	No	No	No	Yes	No	Yes
	Yes	Yes	Yes	No	Yes	Yes	Yes
	Many	No	No	No	Many	No	Many
	Yes	Yes	Yes	No	Yes	Yes	Yes
	Yes	Yes	Yes	No	Yes	Yes	Yes
	No	Yes	No	No	Yes	No	Yes
	No	Yes	Yes	Yes	Yes	Yes	Yes
	No	Yes	Yes	Yes	No	Yes	Yes
	Many	Many	Many	Yes	Yes	Many	Many
	No	Yes	Yes	Yes	No	Yes	Yes
	No	Yes	Yes	No	No	Yes	Yes
	None	Yes	Yes	Yes	No	Yes	Yes
	No	Yes	Yes	No	No	Yes	Yes
	Yes	No	No	No	No	Yes	Yes
	Yes	Yes	Yes	No	No	Yes	Yes
	No	No	No	No	No	No	Yes
	No	Yes	Yes	No	No	No	No
	Yes	Yes	Yes	No	No	Yes	Yes
	Yes	Yes	No	Yes	No	Yes	No
	Yes	Page titles only	Page titles only	Yes	Titles only	Yes	Yes
	Yes	Yes	Yes	Yes	No	Yes	Yes
	Yes	Yes	Yes	Yes	No	Yes	Yes
	Option	Yes	Yes	No	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Yes	No	No	No	No	No	Yes
	Many built-in functions					Sample templates included	Includes graphics

Spreadsheet Comparison

	MicroPro International/CalcStar	Microsoft/Multiplan	Peachtree Software/PeachCalc	Perfect Software/PerfectCalc	
CAPACITY					
Minimum memory	128K	128K	64K	128K	
Maximum memory	Ltd. by memory	1 Mb	256K	128K	
Use virtual memory?	No	No	Yes	No	
Max. rows	255	255	254	255	
Max. columns	127	63	63	52	
Max. cells	20,000	16,002	16,002	13,260	
Max. windows	1	8	2	2	
LAYOUT AND LABELING					
Variable width columns?	Yes	Yes	Yes	Yes	
Individually variable widths?	No	Yes	Yes	Yes	
Align data left or right?	Yes	Yes	Yes	Yes	
Center label in column?	Yes	Yes	Yes	Yes	
Underline or inverse video?	Underline only	Inverse video only	Underline only	No	
Leading dollar signs?	Yes	Yes	Yes	No	
Minus signs?	Yes	Yes	Yes	No	
Negative numbers in parentheses?	Yes	Yes	No	No	
Credit (CR) and debit (DR) notation?	Yes	No	Yes	No	
Commas in numbers?	Yes	Yes	No	No	
Protect cells, rows, or columns?	No	Yes	Yes	Yes	
FORMULAS AND FUNCTIONS					
Net current value?	No	Yes	Yes	Yes	
Rate of return?	No	Yes	No	No	
Other financial functions?	No	Many	No	No	
Average?	Yes	Yes	Yes	Yes	
Percentage?	Yes	Yes	No	Yes	
Statistical functions?	No	Many	Yes	No	
Absolute value?	Yes	Yes	Yes	Yes	
Logarithms?	Yes	Yes	Yes	Yes	
Trigonometric functions?	No	Yes	Yes	Yes	
Sum?	Yes	Yes	Yes	Yes	
Max. and min. value?	Yes	Yes	Yes	Yes	
Other arithmetic functions?	Yes	Many	Many	Many	
If-Then operators?	Yes	Yes	Yes	Yes	
Table lookup?	No	Yes	Yes	Yes	
Other logical operators?	Yes	Yes	Yes	Yes	
ENTERING INFORMATION					
Replicate rows and columns?	Yes	Yes	Yes	Yes	
Replicate blocks?	No	Yes	Yes	Yes	
Insert rows or columns?	Yes	Yes	Yes	Yes	
Sort rows or columns?	No	Columns only	No	No	
Global search and replace?	No	No	No	No	
PRINTING AND FORMATTING					
Print screen contents?	Yes	Yes	Yes	Yes	
Use special printer features?	No	Yes	No	Yes	
Automatically fit output to paper?	Yes	Yes	Yes	Yes	
Page titles or numbering?	Titles only	No	No	No	
FILE HANDLING					
Interface to other programs?	Yes	Yes	Yes	Yes	
Save worksheet as text file?	Yes	Yes	Yes	Yes	
Link two or more worksheets?	Yes	Yes	Yes	Yes	
DOCUMENTATION AND HELP					
On-screen help or tutorial?	Yes	Yes	Yes	Yes	
Demo or tutorial disk included?	Yes	No	No	Yes	
OTHER FEATURES					
	Sample templates included		Sample templates included	19 templates included	

Chart

Schuchardt Software Systems/InteCalc	Software Products International/ProCalc	Sorcim/SuperCalc 3	Structured Systems Group/Magic Worksheet	Supersoft/Scratch Pad	VisiCorp/VisiCalc IV IBM PC	VisiCorp/Advanced VisiCalc Apple IIe
128K	128K	96K	128K	48K	128K	128K
Ltd. by memory	Ltd. by memory	Ltd. by memory	Ltd. by memory	48K	512K	128K
No	Yes	No	No	Yes	Yes	Yes
255	216	254	255	999	254	254
255	132	63	64	999	63	63
16 million	28,512	16,002	16,256	Ltd. by memory	16,002	16,002
4	6	2	2	Unlimited	2	2
Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	No	No	Yes	No	No
No	Yes	No	No	No	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	No	Yes	Yes	Yes
Yes	Yes	Yes	No	Yes	No	No
Yes	Yes	No	No	No	No	No
Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	No	No	No	No	No	No
Yes	Yes	Yes	Yes	Yes	Yes	Yes
No	No	No	No	No	No	No
Yes	Yes	Yes	Yes	Yes	Yes	Yes

How to Buy an Electronic Spreadsheet

(continued from page S-7)

Other Considerations

Some spreadsheet programs have calendar functions. For example, *Advanced VisiCalc* can convert the calendar date to an absolute date and extract the year, month, or day for use on the worksheet. It will also convert the time to fractions of a day. *SuperCalc* has similar capabilities, while *ProCalc* and *Target* permit the current date to be entered into the worksheet.

In the user-friendliness department, we are always astonished at the differences between packages that do essentially the same thing. It seems sensible to us that the most used commands be abbreviated to their first letter, S for save, L for load, M for move, I for insert, and so on. But how many programs incorporate this logical approach? Far fewer than we would hope. And although *Multiplan* has many advanced features, it has the most cumbersome cell identification scheme (R34C21) of any spreadsheet. Were the Microsoft designers out to lunch that day or what?

Menus are the rage among software designers these days. Unfortunately, they are generally slower than cryptic but simple commands. If the more experienced user can bypass the menu as is possible on certain software packages, then we have no objection to their use. However, *Magicalc* does not offer this alternative and is thus slower than other systems.

A word about speed. We devised a nifty benchmark for spreadsheet packages. However, the packages we tested were not all for the same computer, and we found that the computer itself made far more difference than the package. As you'll note from our benchmark page, the TI Professional is 6.8 times faster than the Apple, so we felt it was unfair to compare *Magicalc* on the Apple with *Microplan* on the TI. Nevertheless, we had several packages for the TI and several for the IBM PC, and we noticed some fairly dramatic speed differences (3 to 1) among packages running on the same computer. However, other features should probably weigh far more heavily than speed in the selection of a spreadsheet.

In the discussion above, we mentioned add-on packages in several places. These packages tend to fall in two categories. In the first group are the ones that have been written to augment the capabilities of the older spreadsheets, primarily *VisiCalc*. Frequently, these features are included in the newer spreadsheets, so these add-ons generally are not of interest to someone buying a package today. We say "generally" because with *VisiCalc* being so heavily discounted today, you might find that *VisiCalc* combined with an add-on package will meet your needs and cost considerably less than a newer package that has additional features that you don't need.

The second category of add-ons includes templates (or programs) for commonly used applications. As we mentioned above, financial and statistical data are also available from the various communications utilities. Another interesting source for data on publicly held companies is Data Resources who furnish on-line data to subscribers in the DIF format.

In addition to software add-ons, there are hardware add-ons designed to be used in conjunction with spreadsheet packages. Apple users can choose from several memory boards that use bank switching to extend memory capacity above 64K. These usually come with software to make the board invisible to the spreadsheet software. Such boards are made by Titan Technologies, Prometheus, Applied Engineering, Omega Microware, and Orbital Systems. Several companies also make 80-column cards for the Apple—almost a must for any serious spreadsheet work.

Integrated Packages

Within the last year, several integrated software packages have come on the market. These combine a spreadsheet with two or more other packages—usually graphics and database management programs. Communications and word processing programs may be included as well. We will be doing a special section on integrated packages in an upcoming issue, so our discussion here is rather brief.

In an integrated package, if you change the value of a variable in any module, it is automatically changed in all the rest. This saves disk shuffling, time, and effort. Users have been very enthusiastic about this approach; as a result, most major software producers have integrated packages in the works.

The two leading integrated packages, *Lotus 1-2-3* and *Context MBA*, include full-featured spreadsheet, graphics, and database management programs. Both also include rudimentary text editing programs as well. A similar package for the Apple is *The Incredible Jack* by Business Solutions, Inc.

Another approach to integration is to have an umbrella program which communicates automatically with the various applications programs. Examples of this are *VisiOn* and *DesQ*. The main difference between the two is that VisiOn requires special programs in VisiCorp's "-On" family such as *VisiOn Word*, *VisiOn Calc*, and *VisiOn Graph*, whereas *DesQ* works with any programs on the IBM XT (*DesQ* requires a 5Mb hard disk).

However, if you already have a computer with a library of software packages and disks full of your own historical data, it may not make sense to jump onto the integrated software bandwagon. In that case, you may be able to achieve nearly the same result with *DesQ* (if you have an IBM XT) or, to a lesser extent, with one or more add-on programs such as *StretchCalc* from MultiSoft Corp.

While we are enthusiastic about the capabilities of *Lotus 1-2-3*, *Context MBA*, *DesQ*, *VisiOn*, and *The Incredible Jack*, we also see them as just the tip of the integrated package iceberg. Original *VisiCalc* was a fabulous product when it was introduced, and it sold countless thousands of computers, yet the second generation of spreadsheet packages offered significantly more features. We think that the same thing will happen in the integrated packages arena. For now, *Lotus 1-2-3* is the big success story, but the second generation of packages will probably have more features and be more user-friendly. As we mentioned earlier, we will be looking at these packages in depth a few months from now. ■

Spreadsheets

Company Name, Address	Spreadsheets	Price	Computer(s)
American Business Systems 3 Littleton Rd. Westford, MA 01886 (617) 692-2600	*Financial Modeling*	$300	CP/M
Antech, Inc. 788 Myrtle St. Roswell, GA 30075 (404) 993-7270	*Copc*	$395	IBM PC MS-DOS
Artsci 5547 Satsuma Ave. N. Hollywood, CA 91601 (213) 985-2922	*Magicalc*	$150	Apple
Business Planning Systems 2 North State St. Dover, DE 19901 (302) 674-5500	*Plan 80* *Plan 86*	$295 $295	CP/M CP/M-86 MS-DOS
Chang Labs 5300 Stevens Creek Blvd. San Jose, CA 95129 (408) 246-8020	*MicroPlan*	$495	Apple IBM PC CP/M-86 MS-DOS CP/M
Computer Software Assoc. Micro Software Int'l The Silk Mill 44 Oak St. Newton Upper Falls, MA 02164 (617) 965-9870	*PractiCalc*	$ 55 $ 40 $ 70	C64 Vic-20 Apple
Comshare Target Software 1935 Cliff Valley Way Atlanta, Ga 30329 (404) 634-9535	*Target Financial Modeling* *Planner Calc*	$325 $100	IBM PC CP/M-86 MS-DOS CP/M
Creative Software 230 E. Caribbean Dr. Sunnyvale, CA 94089 (408) 745-1655	*Creative Calc*	$ 50	C64 Apple IBM PC IBM PCjr
Creative Software Concepts P.O. Box 349 Binghamton, NY 13902 (607) 722-3235	*Superscreen*	$500	CP/M
Cromemco 280 Bernardo Ave. Mt. View, CA 94043 (415) 964-7400	*Calcmaster*	$295 (included with C10)	CDOS
Handic Software 520 Fellowship Rd., B-206 Mt. Laurel, NJ 08054 (609) 866-1001	*CalcResult Easy* *CalcResult Advanced*	$ 50 $100	C64 C64

Company Name, Address	Spreadsheets	Price	Computer(s)
HesWare 150 North Hill Dr. Brisbane, CA 94005 (415) 468-4111	*Multiplan*	$ 10	C64
Hourglass Systems P.O. Box 312 Glen Ellyn, IL (312) 690-1855	*Fast Figure* *Novacalc*	$200 $ 30	Wang North Star CP/M IBM PC
Information Unlimited Software 2401 Marinship Way Sausalito, CA 94965 (415) 331-6700	*Easy Planner*	$250	IBM PC TI Pro
Int'l Publishing and Software 3948 Chesswood Dr. Downsville, ON M3J 2W6 (416) 636-9409	*CalcPro*	$ 30	C64 Vic-20
Lifeboat Associates 1651 Third Ave. New York, NY 10028 (212) 860-0300	*UniCalc*	$195	IBM PC MS-DOS CP/M-86
Lotus Development Corp. 161 First St. Cambridge, MA 02142 (617) 492-7171	*Lotus 1-2-3*	$495	IBM PC MS-DOS TI Pro DEC Rainbow
MetaSoft Corp. 6509 W. Frye Rd. Chandler, AZ 85224 (602) 961-0003	*Benchmark*	$295	IBM PC CP/M MS-DOS
MicroPro Int'l 33 San Pablo Ave. San Rafael, CA 94903 (415) 499-1200	*CalcStar*	$195	CP/M IBM PC MS-DOS CP/M-86
Microsoft 10700 Northup Way Bellevue, WA 98004 (206) 828-8080	*Multiplan*	$195	Apple IBM PC MS-DOS CP/M CP/M-86
Omni Software Systems 146 N. Broad St. Griffith, IN 46319 (219) 924-3522	*Electronic Worksheet*	$150	Sorcim
Peachtree Software 3445 Peachtree Rd. NE Atlanta, GA 30326 (404) 239-3000	*PeachCalc*	$150	IBM PC Apple CP/M MS-DOS
Perfect Software 701 Harrison St. Berkeley, CA 94701 (415) 527-2626	*PerfectCalc*	$250	CP/M IBM PC MS-DOS CP/M-86

Spreadsheets

Company Name, Address	Spreadsheets	Price	Computer(s)
Rainbow Computer Corp. 490 Lancaster Pike Frazer, PA 19355 (215) 246-3582	Spreadsheet Assistant Sr. Graphics Assistant	$ 30	CP/M
Schuchardt Software Systems 515 Northgate Dr. San Rafael, CA 94903 (415) 492-9330	InfoCalc	$295	IBM PC MS-DOS
Sim Computer Products 1100 E. Hector St. Whitemarsh, PA 19428 (215) 825-4250	Home-Cale	$ 40 $ 30	Atari CP/M
Softlaw Corp. 9072 Lyndale Ave. So. Bloomington, MN 55420 (612) 881-2777	VP-Calc	$ 60	TRS-80 Color Computer
Software Products Int'l 10240 Sorento Valley Rd. San Diego, CA 92121 (619) 450-1526	ProCalc Dog-Calc	$275 $125	IBM Display- writer UCSD Pascal
Sorcim 2195 Fortune Dr. San Jose, CA 95131 (408) 942-1727	SuperCalc SuperCalc SuperCalc	$195 $295 $395	MS-DOS IBM PC CP/M TI Pro
Structured Systems Group 5204 Claremont Oakland, CA 94618 (415) 547-1567	Magic Worksheet	$295	CP/M CP/M-86 MS-DOS
Supersoft Box 1628 Champaign, IL 61820 (217) 359-2112	Scratch Pad	$295	CP/M CP/M-86 MS-DOS
Tandy/Radio Shack 1800 One Tandy Center Ft. Worth, TX 76102 (817) 390-3300	Spectacular	$ 50	TRS-80 Color Computer
TexaSoft, Inc. 660 One Energy Square Dallas, TX 75205 (214) 369-0795	The Thinker	$ 75	IBM PC MS-DOS
Timberline Systems 7180 SW Fir Loop Portland, OR 97223 (503) 684-3660	Timberline Spreadsheet	$295	IBM PC TI Pro DEC Rainbow
VisiCorp 2895 Zanker Rd. San Jose, CA 95134 (408) 946-9000	VisiCalc Adv. VisiCalc VisiCalc II	varies $400 $400	Apple Atari TRS-80 Apple IBM PC
Xedex Corp. 222 Route 59 Suffern, NY 10901 (914) 368-0653	Calcstar WonderCalc	$295 $395	IBM PC with Baby Blue co- processor

Note: Frequently, when packages are available for the IBM PC, versions are available for other computers with MS-DOS. Packages available for CP/M and CP/M-86 will generally run on many machines.

Templates, Enhancements, and Instructional Materials

Company Name, Address	Spreadsheets	Products
Abacus Associates 6565 W. Loop South Bellaire, TX 77401 (713) 666-8146	*VisiCalc*	Viz.A.Con **($139.95)** performs hierarchical worksheet consolidation. Viz.A.Merge **($139.95)** combines sections, rows, and columns.
AgDisk/HTS 624 Peach St. Lincoln, NE 68501 (402) 476-2811	*VisiCalc*	Farm management templates **($95** each) for herd, crop, feed lot, machinery, and swine finishing management.

Company Name, Address	Spreadsheets	Products
Alpha Software 12 New England Executive Park Burlington, MA 01803 (617) 229-2924	*VisiCalc* *Multiplan* *Lotus 1-2-3*	The Executive Package (**$145**) is a collection of 40 case studies and solutions to various business problems.
Anthro-Digital 103 Bartlett Ave. Pittsfield, MA 01202 (413) 448-8278	*VisiCalc*	Project performance (**$35**) and farm management templates (**$60**); VersaCalc (**$100**) enhancement package and tutorial.
ATI Training Power Software Training 3770 Highland Ave. Manhattan Beach, CA 92066 (213) 546-5579	*VisiCalc* *MultiPlan* *SuperCalc* *MicroPlan* *others*	ATI Training Power for Planners (**$75**) provides step-by-step instruction and simulations for effective spreadsheet usage.
Banbury Books, Inc. 353 W. Lancaster Ave. Wayne, PA 19087	*Lotus 1-2-3*	The IMB PC and 1-2-3 is a book with disk for basic and intermediate instruction (**$39.95**).
Busi•Math Corp. 155 State St. Ripon, WI 54971 (414) 748-3422	*VisiCalc* *SuperCalc* *Multiplan* *Lotus 1-2-3*	Busi•Math (**$145**) provides equations and calculations for solving annuity, loan, and other financial problems.
Cdex Corp 5050 El Camino Real Los Altos, CA 94022 (415) 964-7600	*VisiCalc* *Multiplan* *SuperCalc*	Cdex Training for Financial Planners (**$69.95**) is self-paced, graphically-oriented instructional program.
Computer Systems Research 40 Darling Dr. Avon, CT 06001 (203) 678-1212	*VisiCalc*	'Survival' Training Course (**$250**) includes instructional audio tapes for 12 hands-on modules.
Consumers Software 106-314 E. Holly St. Bellingham, WA 98225 (604) 688-4548	*VisiCalc* *Multiplan* *SuperCalc* *Lotus 1-2-3*	Spreadsheet Checker (**$99**) is a program to print normally hidden formulas and formats.
Cypher 121 Second St. San Francisco, CA 94105 (415) 974-5297	*VisiCalc*	MergeCalc (**$125**) consolidates worksheets; LoadCalc (**$95**) makes DIF files from text files.
Data Resources 29 Hartwell Ave. Lexington, MA 02173 (617) 861-0165	*VisiCalc*	On-line database of financial data of many companies in DIF format.
Data Security Concepts Box 31044 Des Peres, MO 63131 (314) 965-5044	*VisiCalc*	Print formatting aids (**$54.95**) for Apple users.
Deltak Microsystems 1751 Diehl Rd. Naperville, IL 60566 (312) 369-3000	*VisiCalc* *Lotus 1-2-3*	Teach Yourself Series (**$65-100**) is an instructional software package for hands-on learning.
El Dorado Software 549A Castro St. San Francisco, CA 94114 (415) 626-0588	*Many*	Buzi-Calc (**$60**) includes 20 financial and business management forms. Calc-Kit (**$100**) is VisiCalc enhancement for data management and printing.
Flip Track Learning 526 N. Main St. Glen Ellyn, IL 60138 (312) 790-1117	*VisiCalc* *SuperCalc* *Multiplan* *Lotus 1-2-3*	How To Use series (**$75** each) include four instructional audio tapes for easy step-by-step learning.
Funk Software P.O. Box 1290 Cambridge, MA 02238 (617) 497-6339	*VisiCalc* *Multiplan* *SuperCalc*	Sideways program (**$60**) to print long worksheets sideways on many printers. Several sizes of print are available.
Integrated Equity Planning 98-211 Pali Momi St. Aiea, HI 96701 (808) 488-4766	*SuperCalc*	Financial Fastrax (**$125**) are templates for personal financial planning.
Little, Brown & Co. 200 West St. Waltham, MA 02154 (617) 277-0730	*VisiCalc*	Instructional software (**$59.95**) has progressive exercises and for hands-on learning; also includes five templates.
Management Information Source distributed by: Prentice-Hall, Inc. Englewood Cliffs, NJ 07632	*VisiCalc* *Multiplan* *SuperCalc* *Lotus 1-2-3*	The Power of: is a series of templates and tutorial books with IBM PC disk included for basic instruction and financial calculations (**$28.95** each).
McIntosh Software 2428 1st Ave. NE Cedar Rapids, IA 52402	*VisiCalc*	AgriCalc (**$125**) is a series of templates for farm management, cash flow, depreciation, more.
Micro Decision Systems 130 Foxcroft Rd. Pittsburgh, PA 15220 (412) 276-2387	*All*	DocuCalc (**$95**) reviews complex models during development; VC Loader converts data files to DIF format.
Micro Learning Concepts 380 Lexington Ave. New York, NY 10017 (212) 687-0066	*VisiCalc*	Learning Concept (**$99.95**) is an instructional video tape which uses the case study method.

Company Name, Address	Spreadsheets	Products
Microsoft 10700 Northrup Way Bellevue, WA 98004 (206) 828-8080	*Multiplan*	Multi-Tool packages **($100-150)** for business budgeting and production of custom financial statements.
MicroVideo Learning 119 W 22nd St. New York, NY 10011 (212) 255-3108	*VisiCalc* *Lotus 1-2-3*	Instructional video tapes **($129.95-$159.95)** combine a video tutorial and written guide.
Money Tree Software 760 SW Madison Ave. Corvallis, OR 97333 (503) 757-1114	*VisiCalc*	MoneyMaker **($139)** includes 32 templates for personal budgeting, financial planning, insurance needs, stock portfolio, and more.
Morgan Computing 10400 N Central Expy. Dallas, TX 75231 (214) 739-5895	*VisiCalc*	Taxcomp template **($100)** for 1040 forms; Simplex PC II **($100)** solves cost control and profit problems.
MultiSoft Corp. 140125 SW Farmington Rd. Beaverton, OR 97005 (503) 626-4727	*VisiCalc*	StretchCalc **($99)** stores keystrokes, produces graphs, and uses function keys on IBM PC.
Norell Data Systems 3400 Wilshire Blvd. Los Angeles, CA 90010 (213) 257-2026	*VisiCalc*	Visualize **($100)** utility for designing cash flow and financial spreadsheets.
Omega Microware 222 S. Riverside Plaza Chicago, IL 60606	*VisiCalc*	Templates for taxes **($49.95)**, also software/hardware to add memory to the Apple **($125+)**.
Personal Tutor Assoc. P.O. Box 246 Clinton, MD 20735 (301) 856-2280	*VisiCalc* *Lotus 1-2-3* *Others*	Personal Tutor packages **($49.95)** include instructional software and audio tapes.
Reston Publishing 11480 Sunset Hills Rd. Reston, VA 22090 (703) 435-8900	*VisiCalc*	MicroLearning System **($75)** is an instructional software package which uses a hands-on approach.
Howard W. Sams 4300 W. 62nd St. Indianapolis, IN 46268 (317) 298-5419	*VisiCalc* *Multiplan*	Financial Planning Mind Tools **($79.95)** include formulas and headings for many financial calculations.
Sofstar 13935 U.S. Hwy 1 Juno Beach, FL 33408 (305) 627-5511	*VisiCalc*	Real Estate Templates **($129)** for amortizations, personal financial statements, rate of return, income analysis.
Software Arts P.O. Box 97 Newton, MA 02162	*VisiCalc*	SATN (Software Arts Technical Notes) is bi-monthly newsletter for effective use of VisiCalc **($30** for 6 issues).
Software Models 23913 Bowl Rd. Crestline, CA 92325 (714) 338-1238	*VisiCalc* *SuperCalc* *Multiplan*	Templates: 18 Construction **($59.95)**, 11 Finance **($59.95)**, 16 Real Estate **($59.95)**, and 5 personal finance **($39.95)**.
Software That Counts 528 N. Milpas St. Santa Barbara, CA 93103 (805) 962-6328	*VisiCalc* *Lotus 1-2-3*	Templates for personal and business accounting and bookkeeping.
Spreadsoft P.O. Box 192 Clinton, MD 20735 (301) 856-1180	*VisiCalc*	Four template packages **($48-$76)** for business budgeting, cash flow and personal investment analysis.
Sunwest Software 2000 S. Logan Denver, CO 80210 (303) 777-9400	*SuperCalc*	Con-Calc **($125)** consolidates worksheets and does rate of return calculations.
Technical Horizons 639 Mary Ann Dr. Redondo Beach, CA 90278 (213) 379-6101	*VisiCalc*	Calc-Connector **($49.95)** converts text files and formatted reports into DIF files. VisiCalc instruction software **($29.95)**.
T & F Software Co. 10902 Riverside Dr. N. Hollywood, CA 91602 (213) 501-5845	*VisiCalc*	P.M.P. 2000 includes property management templates for cash receipts, tenant status, expense distribution, invoicing, more.
Titan Technologies Box 8050 Ann Arbor, MI 48107 (313) 973-8422	*VisiCalc*	Software/hardware for Apple for additional memory and 80 columns **($49.95-$79.95)**.
Videx 897 NW Grant Ave. Corvallis, OR 97330 (503) 758-0521	*VisiCalc*	Preboot software **($69)** for Apple Videx 80-column card.
Weyer-Ware 8991 Jane Rd. N. Lake Elmo, MN 55042 (612) 770-8991	*VisiCalc*	Master Business Analyzer **($59.95)** for doing 5- and 10-year forecasts and analyses of new product or business.
Yucaipa Software 12343 12th St. Yucaipa, CA 92399 (714) 797-6331	*VisiCalc*	V-Utility **($130)** sorts columns; does statistical calculations and printing; also includes several templates.

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CIRCLE 128 ON READER SERVICE CARD

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Growing Up Literate

The State of The Language Arts in Software

CREATIVE COMPUTING **SOFTWARE EVALUATION**

Betsy Staples

Galaxy Search

Galaxy Search is a reading skills game designed to help children make predictions based on the information in a short reading selection. The setting for the game is a hi-res map of the galaxy reduced to eight planets plus Earth. Your assignment is to collect the three components of a robot which are kept on various planets.

You navigate through the galaxy using the A, Z, and arrow keys. To land on one of the planets, you have only to come close enough to it to be drawn into orbit, after which you can land. When you land, the surface of each planet is depicted in pleasing hi-res graphics, and your progress is marked by a small white, flickering human form.

While on a planet, you may meet an alien. If you do not, you simply lose your turn and return to your spaceship to await the next. If an alien appears, however, you have a chance to answer a question that can net you a robot part. One of the questions we got was:

"Amy kept a chicken in her backyard. She lived on Planet Toova, but the chicken was from the Planet Earth. There were two eggs that the chicken had laid. The chicken had been sitting on the two eggs. Amy waited for something to happen.

"What prediction can you make?

"A. The eggs will get smaller.

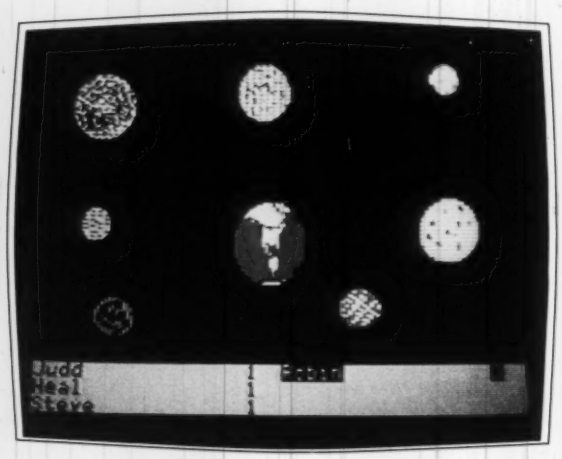
"B. Baby chicks will appear.

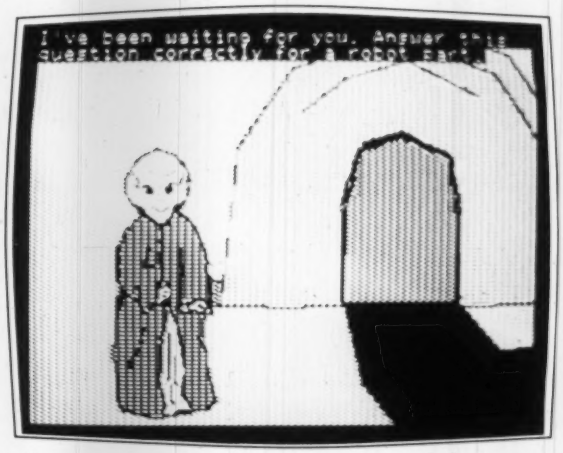
"C. A duck will appear."

The prose is far from deathless, but our playtesters got the message and the correct answer, and were rewarded with the robot's body.

The process of moving from one planet to another is complicated by what appear to be intelligent meteors that follow your ship around the galaxy and damage it if they get too close. You also have a limited amount of fuel. If you are either hit by a meteor or run out of fuel, you lose a turn.

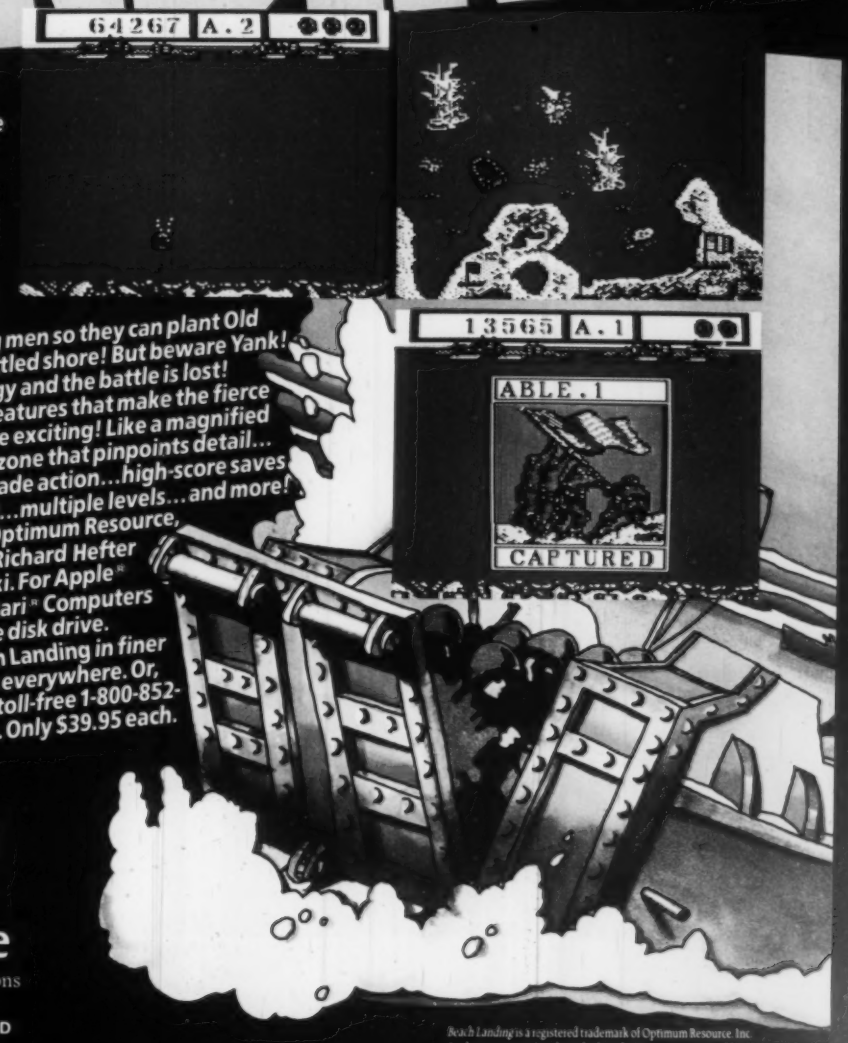
Losing a turn is of consequence only when more than one person (2-6 can play) is playing the game. Players can also learn from one another's mistakes (which planets are uninhabited) and successes (which





Galaxy Search

BEACH LANDING!



Beach Landing, the spine-tingling new strategy arcade game from Weekly Reader Family Software, offers the thrill of combat as landing ships hit the shell-wracked beach ...dodge withering enemy fire...and unload our fighting men so they can plant Old Glory on the embattled shore! But beware Yank! One error in strategy and the battle is lost!

Look for great features that make the fierce invasion even more exciting! Like a magnified view of the battle zone that pinpoints detail... real strategy...arcade action...high-score saves ...fabulous sound...multiple levels...and more!

Developed by Optimum Resource, Inc. Designed by Richard Hefter and Susan Dubicki. For Apple® Computer and Atari® Computers with 48K and one disk drive.

Look for Beach Landing in finer computer stores everywhere. Or, order by calling toll-free 1-800-852-5000, Dept. AD8. Only $39.95 each.

BEACH LANDING
Weekly Reader Family Software
A division of Xerox Education Publications
Middletown, CT 06457

CIRCLE 192 ON READER SERVICE CARD

Beach Landing is a registered trademark of Optimum Resource, Inc. Apple is a registered trademark of Apple Computer, Inc. Atari is a registered trademark of Atari Computer, Inc. A M 33-E8.

planets have which parts).

When all three parts have been collected, you must return to Earth where you receive an audio/visual welcome. Unfortunately, the finished robot—a bit of reinforcement our playtesters would have welcomed—is never shown.

Utilities

The program contains a utilities section that can be accessed by a parent or teacher. Functions include add or edit names, view scores, print scores, set all scores to zero, erase all names and scores, and change parameters. By adding up to 40 names, you can create a roster of players who are authorized to play the game—a feature that serves to limit the use of the game. The program maintains cumulative scores for those whose names are on the roster and allows you to print those scores as desired.

The change parameters function allows you to change such factors as the length of time a message appears on the screen, the speed of the ship, the amount of fuel available for each turn, the probability of finding an alien, the probability of encountering a meteor, and the speed of the meteor.

The package we evaluated was designed for second and third graders, although we did not discover that until we read the booklet; the packaging says only that it is "Red Level (Reading Level 2.0-3.5)." There is apparently a similar package for Blue Level students in grades 4 and 5.

Documentation

The documentation booklet contains 11 pages of instructions for game play and use of the utilities, supplementary activities, and references for those who care what research "suggests that academic games are viable tools for promoting interaction between students of varying academic and social levels."

All the necessary information is there in sufficient detail, so the novice computer user need not fear failure or embarrassment in front of second or third graders.

Our only complaint about the documentation extends to a few of the reading selections: there are some slight stylistic errors that we hate to find in an educational program. For example, one sentence in the booklet reads: "If a player finds a robot part that he or she already has, they will not get the part, and the turn will be ended." If that doesn't set your teeth on edge, you will have no problems at all with the minor inconsistencies in the reading selections.

Summary

Galaxy Search is a unique package; we have never seen a program designed to develop prediction skills. The format is imaginative, and we are willing to overlook a few rough edges in a program that is both unusual and effective.

Overall, it gets a good rating. Although the ability to create a roster suggests that the program is intended for use in the classroom, *Galaxy Search* could be used effectively in the home as well.

CIRCLE 407 ON READER SERVICE CARD

SOFTWARE PROFILE

Name: Galaxy Search

Type: Educational game

Suggested Age: Grades 2 and 3

System: Apple

Format: Disk

Summary: Space game helps students learn to make predictions.

Price: $49.95

Manufacturer:
Learning Well
200 South Service Rd.
Roslyn Heights, NY 11577
(516) 621-1540

Spellagraph

Spellagraph is a rebus game with an important difference. This one provides effective drill of spelling words in context.

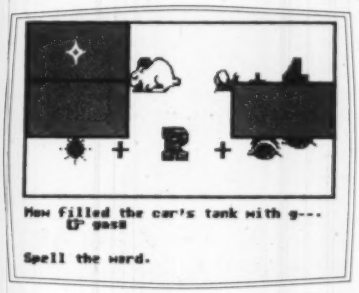
The game comes with 20 word lists, each of which consists of between 12 and 30 words. As play begins, you can choose to drill various vowel sounds at different grade levels, consonant clusters, vowel digraphs, or adjoining vowels. There is also a category called Media Mania which lists words associated with publishing and broadcasting. You can also choose a list that you have entered on the data disk.

You then specify the number of words you want to use and the skill level, and get a chance to examine the entire list before you start to play.

With the preliminaries out of the way, the game begins as a blank grid appears on the screen; the more words you have elected to practice, the larger the grid. Using the I, J, K, and M or arrow keys, you move the cursor to the square you want to uncover and press RETURN.

A sentence then appears at the bottom of the screen. One of the words is missing, its presence indicated by the initial letter and an appropriate number of dashes, and your job is to guess the word from its context and type it correctly to fill in the blank.

If you type the entire word correctly, the square you chose is filled in with part of the rebus. If you spell the word incorrectly, the misspelling is crossed out and the correct spelling displayed beneath it. You get one more chance to spell it right, but only the first spelling counts toward uncovering the rebus. Each time you spell a word correctly, you get a chance to guess the rebus.



Spellagraph

The game ends when one of the players correctly types the message spelled out by the rebus. Each player then gets a report on his performance: number of words spelled correctly on the first try, percentage of time words were spelled correctly on the first try, and the words that were missed.

Adding Your Own Words

You can create your own word lists on a separate data disk using spelling words, vocabulary words, or anything else you want to practice. You assign each list a title and type in a spelling rule (e.g., The long i sound may be spelled i or y) if applicable. Then you enter your words and context sentences.

Changes, additions, and deletions are easily made just by selecting the appropriate instruction from the onscreen menu.

SOFTWARE PROFILE

Name: Spellagraph

Type: Educational game

Suggested Age: 7 to 14

System: Apple, Atari, IBM PC

Format: Disk

Language: Forth-79

Summary: Effective spelling drill and practice in game format.

Price: $39.95

Manufacturer:
DesignWare
185 Berry St., Bldg. 3, Ste. 158
San Francisco, CA 94107
(800) 572-7767
(415) 546-1866

IS YOUR CHILD TOP BANANA, OR JUST ONE OF THE BUNCH?

Kids everywhere are going ape over Artworx Monkey Series educational software! Like all good arcade games, kids just can't stop playing them. Which is great, because while they're enjoying the antics of Marc the Monkey, they're learning. And growing.

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Monkeymath™ uses colorful graphics and three levels of challenges to give a better understanding of number sequences, addition, subtraction, multiplication, and division.

Monkeynews™ uses a newspaper setting to increase your child's ability to read and understand by enabling him to actively participate in the story, answer questions, check facts and type his own headlines.

Monkeynews

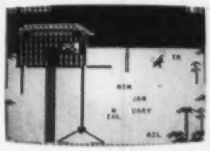
For help with spelling and vocabulary, choose *Monkeybuilder*™. It encourages the child to combine word pieces correctly to form building blocks, and make a tree house for Marc.

All three programs are more fun than a barrel of you-know-whats!

All are available for the Commodore 64, Atari, and Apple computers. All include a FREE Marc the Monkey story and coloring book. And they're all the stuff top bananas are made of!

See them in action wherever software is sold. To find out more facts, send $1.00 for a colorful catalog to: Artworx Software Co., Inc. 150 North Main Street, Fairport, NY 14450.

Or call: 800-828-6573.
(In New York call: 716-425-2833).


Monkeybuilder

Monkeymath
by Dennis Zander

Monkeynews
by Dennis Zander

Monkeybuilder
by Dean Kindig and Rob Fitter

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"The UltraTerm shines brightest in use with spreadsheets and word processors."

COMPUTER RETAILING —FEB. '84
"The UltraTerm is a high quality investment for anyone who has an Apple product and wants to add to it."

PEELINGS II—VOL. 4. NO. 8 '83
"The UltraTerm will be the new industry standard for Apple video display cards. The availability of the extra modes will enhance almost any software product that uses the text screen."

PERSONAL COMPUTING —MAY '83
"Perhaps the most impressive achievement of the UltraTerm expansion board is that the character set it produces is so sharp that its difficult to see the dots that make up each character."

The experts agree—the UltraTerm is one of the best display devices for Apple computers.

Videx Inc.
1105 NE Circle Blvd.
Corvallis, OR 97330
(503) 758-0521

CIRCLE 188 ON READER SERVICE CARD

Documentation

The 28-page documentation booklet covers playing the game and adding your own words quite thoroughly; each step is clearly illustrated.

In addition to the instructions, the booklet includes all the word lists and suggestions for other uses of the program, such as "Make word lists with the names of famous people."

The documentation of *Spellagraph* is exactly what you should expect to find with an educational package. Although it may seem redundant to some, the booklet assumes nothing. An inexperienced parent, teacher, or student can pick up the package and use it painlessly. If he finds himself in a puzzling situation, he can look through the booklet and solve his problem quickly and easily.

The documentation of Spellagraph is exactly what you should expect to find with an educational package.

We wish more manufacturers would follow the lead of DesignWare in documentation.

Summary

We liked *Spellagraph* very much. It is fun for learners of all ages, and offers useful drill and practice with spelling—something we have seen in few other packages.

The ability to add your own word lists is a big plus, as is the comprehensive documentation. If entertaining spelling practice is your goal, try *Spellagraph*.

CIRCLE 408 ON READER SERVICE CARD

Reading Comprehension Skills 3

The EasyReader series from American Educational Computer includes six packages—three that drill sounds and words and three that provide practice in reading comprehension skills. *Reading Comprehension Skills 3*, designed for seventh and eighth graders, appears to be the culmination of the series.

The program begins with a series of rather general questions that seem intended to test your ability to categorize things. You must choose to which class—history, English, science, phys. ed.—a given topic, such as "cells," belongs. Or you choose in which group—dairy products, meat and poultry, fruits and vegetables, grains and pasta—a given food, such as carrots, is found.

Having honed your categorization skills, you move on to more complex tasks. As we worked through this second section, we were reminded of the *Weekly Reader* reading comprehension tests that we enjoyed (yes, enjoyed) as children. In this case, the reading selection is found in a 12-page booklet that comes with the program. When you have finished reading the selection, you answer questions posed by the computer.

The booklet contains seven short selections on topics ranging from desert plants to the Minneapolis-St. Paul "skywalk." The questions are designed to sharpen your critical faculties rather than test for factual learning. One type asks you to decide which phrase describes the paragraph: Appeals to emotion more than logic; Appeals to logic more than emotion; Supports opinions with facts; Uses loaded words.

As it turns out, there are two correct answers to each question of this type, but you must find that out through trial and error; there is no indication that you are looking for more than one answer either on the screen or in the documentation. As it also turns out, the correct answers occur in sets; numbers 1 and 4 always go together as do 2 and 3. This removes a bit of the challenge from the quiz.

Another type of question asks you to decide whether the purpose of a paragraph is to inform, to persuade, to teach a lesson, or to entertain. A third type is unrelated to the reading selections. It asks you to tell whether a sentence such as "Spaghetti makes a delicious and inexpensive meal" shows a fact or opinion.

These are all good approaches that

SOFTWARE PROFILE

Name: Reading Comprehension Skills 3

Type: Educational

Suggested Age: Grades 7 and 8

System: Apple

Format: Disk

Summary: Good concepts not taken far enough.

Price: $39.95

Manufacturer:
American Educational Computer
2450 Embarcadero Way
Palo Alto, CA 94303
(415) 494-2021

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Do you wish you could play with something as intelligent as your word processor?
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Introducing Millennium software. Literate. Engrossing. Enriching. And Playful.
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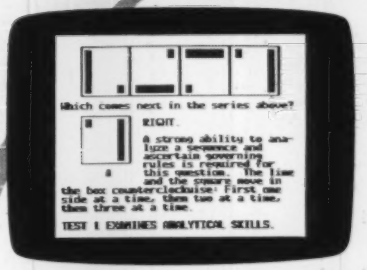
The Brain Game


Which comes next in the series above?
RIGHT.
A strong ability to analyze a sequence and ascertain governing rules is required for this question. The line and the square move in the box counterclockwise: First one side at a time, then two at a time, then three at a time.
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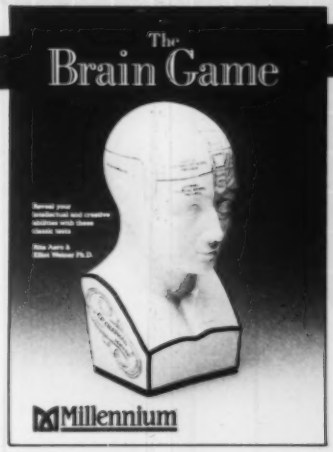

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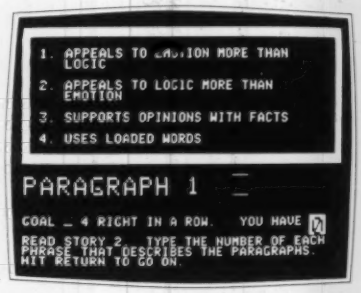
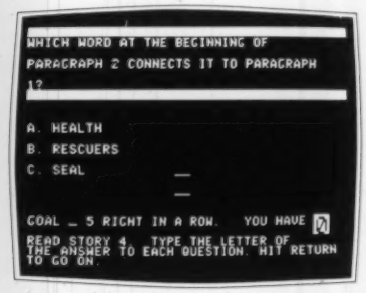

1. APPEALS TO EMOTION MORE THAN LOGIC
2. APPEALS TO LOGIC MORE THAN EMOTION
3. SUPPORTS OPINIONS WITH FACTS
4. USES LOADED WORDS
PARAGRAPH 1
GOAL _ 4 RIGHT IN A ROW. YOU HAVE
READ STORY 2. TYPE THE NUMBER OF EACH PHRASE THAT DESCRIBES THE PARAGRAPHS. HIT RETURN TO GO ON.


WHICH WORD AT THE BEGINNING OF PARAGRAPH 2 CONNECTS IT TO PARAGRAPH 1?
A. HEALTH
B. RESCUERS
C. SEAL
GOAL _ 5 RIGHT IN A ROW. YOU HAVE
READ STORY 4. TYPE THE LETTER OF THE ANSWER TO EACH QUESTION. HIT RETURN TO GO ON.

Reading Comprehension Skills 3

should accomplish the goal of sharpening your critical faculties. The problem with all of them is that there just isn't enough. Each reading selection is followed by only three questions. To progress, you must get three questions in a row right. If you get them right the first time, everything is fine, but since there are only three questions, if you miss one, you must keep going over them until you memorize the correct sequence of answers. The pedagogy seems questionable.

Teachers and, especially, parents need guidance for using educational programs just as much as businessmen need instructions for using Lotus 1-2-3.

The program also lacks any facility for adding your own questions about either the provided reading selections or others that you might like to consider.

Documentation

The other serious flaw in this package and the other that we looked at in the same series is documentation; there is none to speak of. Each package contains a User's Guide that is really nothing more than an advertisement for the series. It provides a picture of a screen from one of the exercises on each disk and lists very general instructions for running the program.

At the end of the booklet there is one page devoted to suggestions for helping the student use the program. We found no educational objectives or instructions for using the student record management feature. Nor is there any attempt to explain the concepts being drilled.

Regular readers are tired of hearing it, we know, but the problem recurs, so we will repeat: documentation can make or break an educational software package. Teachers and, especially, parents need guidance for using educational programs just as much as businessmen need instructions for using *Lotus 1-2-3*. It is not unreasonable to expect a detailed description of each type of question or exercise in a package along with a discussion of what that question or exercise is intended to teach or drill.

Student Record Management

The student record management system is designed to keep track of the scores of a group of students. Since documentation is absent, we had difficulty adding names, and in fact failed to do so. We succeeded in deleting one of the names that was on the disk when we received it, but we cannot vouch for the efficacy of the system as a whole.

Summary

American Educational Computer is on the right track. All the concepts used in the program are sound, and the idea of teaching students to be critical of things they read is commendable.

We think, however, that the number of questions provided is inadequate. We would prefer fewer exercises with more questions for each. A system for adding questions in the formats already available on the program would also add greatly to the package. As it stands, the program is probably satisfactory for classroom use, where the number of students makes up for the dearth of questions, but for the home, where one or two students will find themselves going over the same questions time and again, something else would be a better investment.

The other sticking point is the inadequate documentation. With good documentation and the ability to add questions, *Reading Comprehension Skills 3* would be an excellent package for home or school use. We look forward to a revised version. ER

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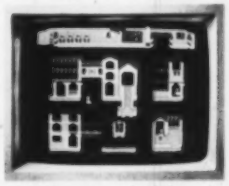

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CIRCLE 115 ON READER SERVICE CARD

Seven New Games

Fun For A Summer's Day

Arthur Leyenberger

In Western society, the number seven has folklore and even mystical status. Seven is a lucky number in craps. There are seven dwarfs, continents, days in the week and wonders of the world. There are even seven deadly sins. And let's not forget the seven-year itch.

With all of these sevens, why not seven computer games? Indeed, here is a healthy half dozen games for your gaming pleasure.

Murder on the Zinderneuf

It is 1936. You are 5000 feet over the Atlantic Ocean flying in the luxury dirigible Zinderneuf. Sixteen passengers were aboard the ship when it left London. Twelve hours out of New York, only 15 remain. The crime is murder. The victim is different in each game. The 15 passengers still alive are the suspects. You are the detective.

So starts the mystery adventure: *Murder on the Zinderneuf. Zinderneuf* has all the elements of a classic mystery: plot, counterplot, clues, suspects, and a famous detective to sort things out and solve the crime.

As each game begins, you choose to be one of eight different detectives. With tongue in cheek, some are reminiscent of famous detectives: Inspector Klutzeau, Lt. Cincinnato, Agatha Marbles. You get the idea. Your choice determines how quickly you will find clues, how explicit the clues are, and how well you interrogate the suspects.

Murder on the Zinderneuf

You roam freely through the dirigible by scrolling with your joystick. You may follow suspects and interrogate them if you wish. The questions you ask are displayed at the top of the screen. They may be asked in a variety of ways such as forceful, naive, pushy, or polite, depending upon the identity of the detective you have assumed. The manner in which you ask a question may determine the answer you get.

You can also search the rooms of the suspects for clues. Once you think you have enough information and clues, you may accuse a suspect. If you are correct and the suspect believes you have enough evidence, he or she will confess. The game will then end, and you will receive a rating from "Feeble Flatfoot" to

SOFTWARE PROFILE

Name: Murder on the Zinderneuf

Type: Interactive mystery

System: Atari, Commodore 64

Authors: John Leyland, Paul Reiche III, and Jon Freeman

Format: Disk

Language: Machine language

Summary: Great whodunnit; novel alternative to text adventure.

Price: $39.95

Manufacturer:
Electronic Arts
2755 Campus Dr.
San Mateo, CA 94403
(415) 571-7171

"Super Sleuth." If you are wrong or do not have enough evidence, the suspect will refuse to speak with you for the remainder of the game. It will not do your reputation and rating much good either.

Zinderneuf was created by Robert Leyland, Paul Reiche III, and Jon Freeman. It is an enjoyable participative mystery that, unlike some text adventures, does not become worthless once you solve the crime. A new victim is chosen each game, and you can assume the role of any of the eight detectives. *Zinderneuf* is especially enjoyable when several people get together and try to solve the mystery.

CIRCLE 410 ON READER SERVICE CARD

Triad

It's about time somebody did something with Tic-Tac-Toe. I mean, this is the computer age, isn't it. Now I am not asking for a mere computerized translation of this venerable classic. What I would like to see is something completely different.

Adventure International has answered my cry. They have taken Tic-Tac-Toe and combined it with a playable shoot-'em-up. The result is *Triad*. Like TTT, the object of the game is to win three squares in a row. But in this game, you must earn those squares.

The screen displays a different bugaboo (that's what they are really called) in each of the nine positions of the Tic-Tac-Toe play area. When it is your turn, you select a square and do battle with that bugaboo. If you succeed in destroying the bugaboo, you earn that square.

The bugaboos are randomly placed in each square at the beginning of the game

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Computer Parade is the second book in the *Katie and the Computer* series. This time Katie and her brother arrive in Cybernia just in time for a computer parade—and to learn how computer music is made. All along their fanciful journey, the threesome encounters friendly and ferocious dragons, computer bits, eeks and aaks. And of course they're always on the lookout for program bugs.

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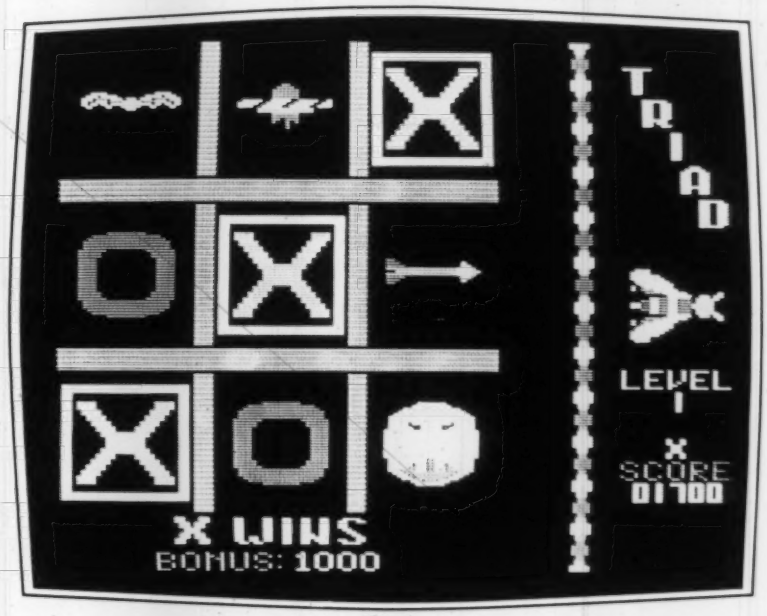

Triad

and each requires unique skills and strategy to destroy. There are moths, faces, bats, saucers, death masks, and killer bees, to name just a few. Some of the enemies fly horizontally, others vertically. Some require a hit head-on while others require that you not fire until you see the whites of their eyes.

Triad is a fun game to play. It is fairly easy at the lower levels, and at the higher levels presents more challenge. It can be played by one player individually, or two players alternating turns.

I would like to compliment Adventure International on two aspects of this game. First, the disk version of the game comes with an Atari version on one side and an Apple version on the other. This helps keep costs down and minimizes the inventory a retailer is required to keep. Second, a *very* fair backup policy is offered. A backup copy of the game may be purchased for only $3.99 plus $2 postage.

Should the original game disk fail to load, it will be replaced for free up to one year from purchase date and for only $5 after that. Adventure International is to be congratulated both for having produced an enjoyable game and, especially, for their sane pricing policy.

CIRCLE 411 ON READER SERVICE CARD

Checkers

Checkers by Odesta Software is a game that is simply well done. From the packaging to the documentation and features, it is a quality product. The power of the computer is not used for fancy frills and meaningless features. Rather, the computer is used to automate the game. The players are freed from such housekeeping chores as scorekeeping and move validation, so they can concentrate on the game play.

Options include: playing the computer at any of 16 levels of difficulty; using the computer screen to let two people play against each other; asking the computer for advice on your move at any time;

SOFTWARE PROFILE

Name: Triad

Type: Tic-Tac-Toe/Shoot-'em-up

System: Atari disk; Color Computer cassette

Author: Ed Hobbs

Format: Disk

Language: Machine language

Summary: Here, you have to earn your squares.

Price: $29.95

Manufacturer:
Adventure International
P.O. Box 3435
Longwood, FL 32750
(305) 862-6917
(800) 327-7172

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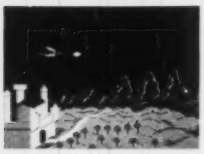

Shooting down the menacing and constantly multiplying Threads isn't easy, but it's only one of the challenges in this official computer game version of Anne McCaffrey's famous book series.

Your strategy will be put to the test as you try to negotiate alliances with Pern's Lord Holders in an attempt to form the most powerful Weyr on the planet. Should you take a firm stance or compromise? Will asking a Craftmaster for assistance increase your chances for success? Maybe you should invite prospective allies to a Wedding or even a Dragon Hatching. Remember to check the Lord Holders personality traits first. It may be critical to your success.

Numerous screens combine to create truly unique and challenging game play. There's even a practice screen to sharpen your Thread Fighting skills.

If you liked the books, you'll love the game. After all, how often do you get the chance to actually fly a dragon?

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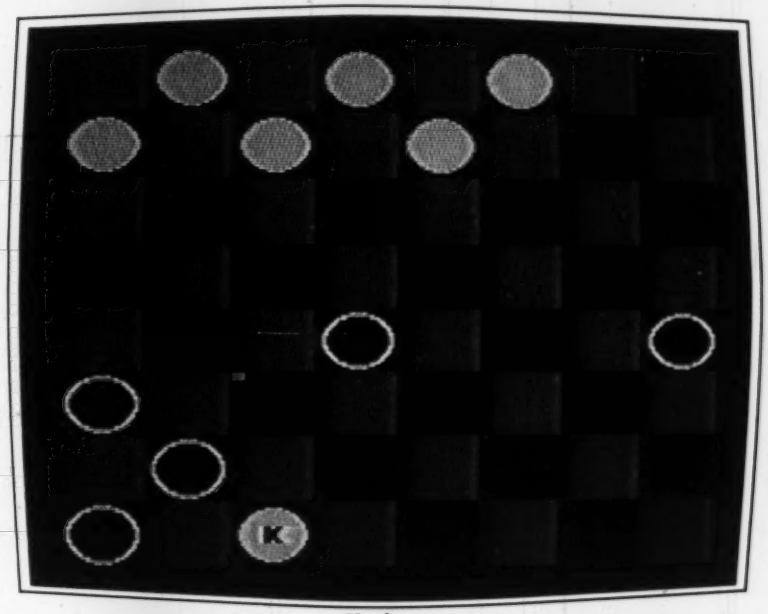


Checkers

having the computer display an instant replay of the entire game ("movie mode"); setting up board positions and continuing play from there; and best of all, watching the computer play itself from either a predefined board position or the beginning.

The player may choose a skill level from 0 to 15. The difficulty level chosen determines the amount of time the computer spends "searching" for its move. In the higher levels, a computer move may take considerable time. A special feature available only on the Atari version of *Checkers* allows the user to blank the screen during the computer's "thinking time," speeding up the process by about 30 percent. For a computer vs. computer game, a separate skill level may be chosen for each side.

Moves are entered via the paddle or keyboard and are checked for legality. Improper entries are indicated by an audible signal and ignored. Up to thirty moves may be taken back at any point in the game. Either half-moves (the player's move) or full moves (one move by each side) may be retracted. The STOP command causes the computer to stop its search and play—its best move so far.

At the conclusion of the game, the player may start a new game, take back the last few moves, or view the *Checkers* "movie" which is a rapid replay of the entire game. Another option permits the player to step through the game move by move.

There are three additional features that I wish it had: a speed game in which each side is forced to move in an allotted amount of time; the ability to print a listing (to a printer) of the entire set of moves for a game; and a screen dump of specific board positions for further analysis.

Checkers is an excellent piece of software from its well written and complete manual (it even gives the history of the game) to its quality packaging. It has many features that will satisfy all types of checkers players. Although it costs

SOFTWARE PROFILE

Name: Checkers

Type: Strategy game

System: Atari, Apple, Commodore 64

Author: David Slate

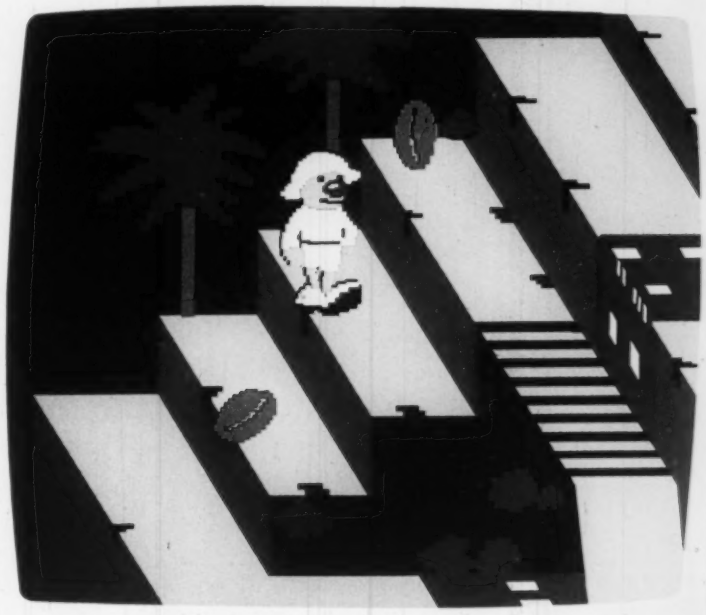
Format: Disk

Language: Machine language

Summary: The definitive Checkers board game.

Price: $49.95

Manufacturer:
Odesta Software
3186 Doolittle Dr.
Northbrook, IL 60062
(312) 498-5615



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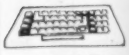

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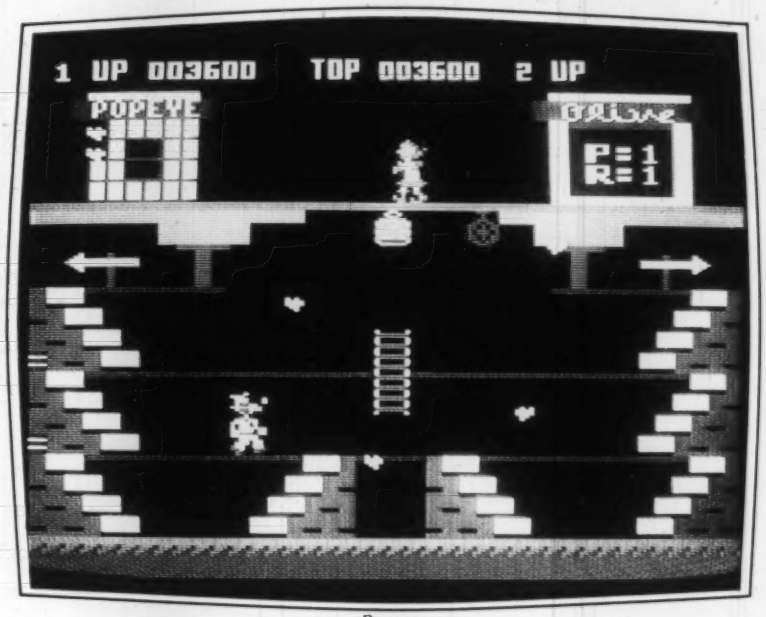


Popeye

slightly more than the typical shoot-'em-up, it is a quality product. I just wish my grandfather were around to give the game a good run for its money.

CIRCLE 412 ON READER SERVICE CARD

Popeye

Popeye is an American tradition. There are few people of any age who remain unaware of the escapades of Popeye, Brutus, and, of course, Olive Oyl. Now, thanks to Parker Brothers, Popeye and his pals have come to the Atari home computers.

In case you are one of the few who do not know the storyline, here it is in a nutshell. Popeye loves Olive Oyl, Brutus loves Olive Oyl and Olive Oyl loves Popeye. The latter fact is a sore point with Brutus. Now that you are familiar with the situation it is not too difficult to imagine what the game is like.

As in the arcade version, you manipulate Popeye around a multi-level pier with your joystick. Your goal is to collect the kisses that Olive is throwing down from the top of the pier. Collecting about 20 of these heart-shaped kisses allows you to go to the next screen.

But there is more to Popeye's life than just collecting kisses. He has his arch rival to contend with. It seems that Brutus likes to punch out our hero who seems unable to escape the oaf's fists—until he eats his spinach, of course. Once Popeye finds the can of spinach and eats it, Brutus gets a taste of his own medicine as the familiar "Popeye the Sailor" tune is heard.

In addition to avoiding Brutus's angry fists, Popeye must avoid jugs that are being thrown at him. The first screen seems to take a long time to complete mainly because you have to collect so many of the hearts. By moving off the screen to the left or right on any of the platforms, you can avoid contact with Brutus and simply dash out occasionally to collect some hearts.

The second screen is slightly different from the first. You are being chased by

SOFTWARE PROFILE

Name: Popeye

Type: Jumping/avoidance game

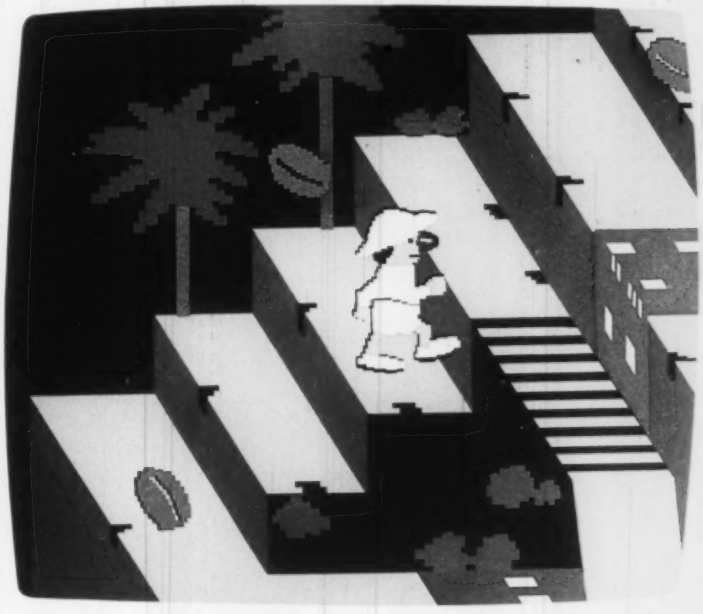
System: Atari, Coleco, Commodore 64, Vic 20, Intellivision

Format: Cartridge

Summary: I am what I am what I am, what else?

Price: $39.95

Manufacturer:
Parker Brothers
50 Dunham Rd.
Beverly, MA 01915
(617) 927-7600



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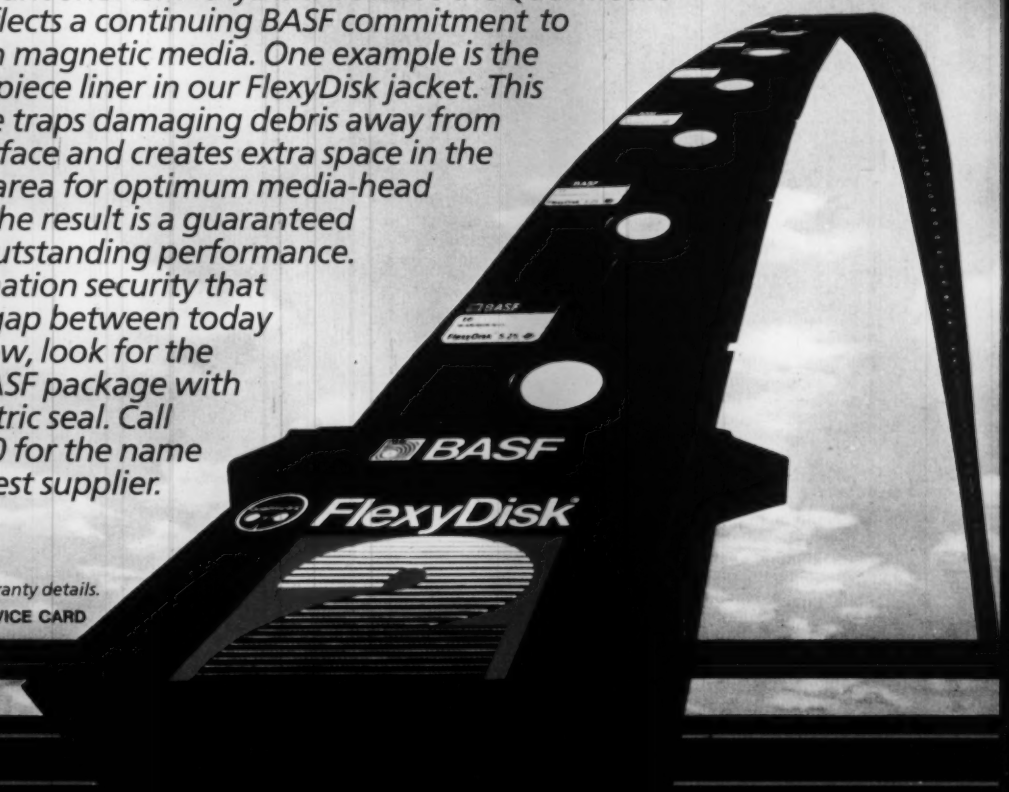

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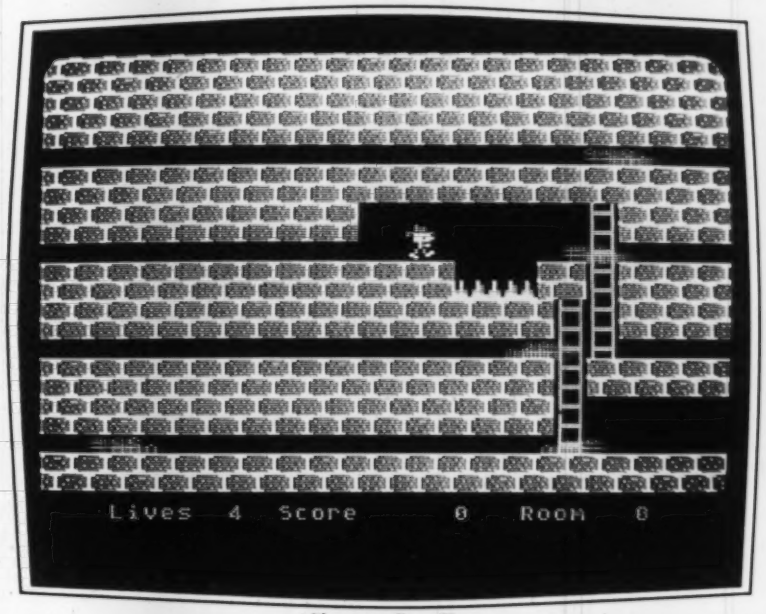

Shamus: Case II

SOFTWARE PROFILE

Name: Shamus: Case II

Type: Shoot-'em-up/adventure

System: Atari, Commodore 64

Format: Disk and cassette

Summary: A high quality sequel to the popular original.

Price: $34.95

Manufacturer:
Synapse Software
5221 Central Ave.
Richmond, CA 94804
(415) 527-7751

Brutus around different floors of a house. This time, instead of hearts, you must collect musical notes that are being thrown by Olive Oyl. There is a trampoline on the lower left side that hurls you to various floors.

Popeye from Parker Brothers is a light-hearted game with attractive animation and good sound. For me, the game does not have much staying power, however. The plot is weak, and the screens do not progress quickly enough. But if you enjoyed the arcade version of the game or are immersed in the Popeye, Brutus, Olive Oyl love triangle, give it a try.

CIRCLE 413 ON READER SERVICE CARD

Shamus: Case II

Synapse Software is one of the most prolific software houses that produce games for the Atari computer. They have been releasing new titles at the rate of about two per month. One of the most recent additions to their already full line is *Shamus: Case II.*

Written by William Mataga, *Case II* is a sequel to the very popular *Shamus.* You will recall that *Shamus* is a combination of an arcade shoot-'em-up and a puzzle-type adventure game. The object of the game was to reach the heart of the Shadow's lair and destroy him. I am happy to report that *Case II* follows in the same tradition. It is not just a thinly disguised variation on the original theme. *Shamus: Case II* has the same clever design and hectic pace of its namesake in a completely new setting.

As usual, the goal is to reach the inner chamber of the Shadow's lair and destroy him. This is accomplished by progressively exploring all of the various levels and rooms and accumulating points, bonuses, and extra lives. This time the Shadow dwells in a vast underwater habitat protected by drone slaves and mutant aquatic life.

You begin your trek in the "pit room," so called because of the many

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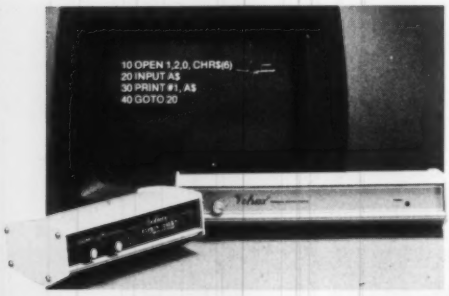

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spiked pits that may easily become your undoing. There are ladders, blind alleys, and snake patrolled passageways that must be navigated as you proceed through the maze. Many enemies must be either destroyed or avoided. These include all sorts of aquatic life such as fiendish fish, cantankerous clams, and mutant mollusks. If you pause for even a moment, the Shadow may swoop down and put an end to you. A quick blast from your plasmar detonator will stun him briefly, and give you enough time to flee.

Other perils also await you. Slider-rung ladders which occasionally lose their rungs at inappropriate moments may cost you your life. And each attacking mutant life form that gets past you causes a piece of the floor to vaporize. When all sections of the floor are destroyed, you drop through to the chamber below, which is not necessarily the last room you were in.

Unlike the original *Shamus, Case II* has a pause feature. This should help you significantly in the preparation of a map of the Shadow's lair. Pressing the spacebar allows you to see the progress you have made by showing your current position and the rooms which have been successfully explored.

Shamus: Case II is really more of a shoot-'em-up than an adventure game. The addition of the multiple rooms and levels does add to the overall effect though, making it more than just another twitch game. The sound and graphics are appealing, making this a worthwhile addition to your game library.

CIRCLE 414 ON READER SERVICE CARD

Pole Position

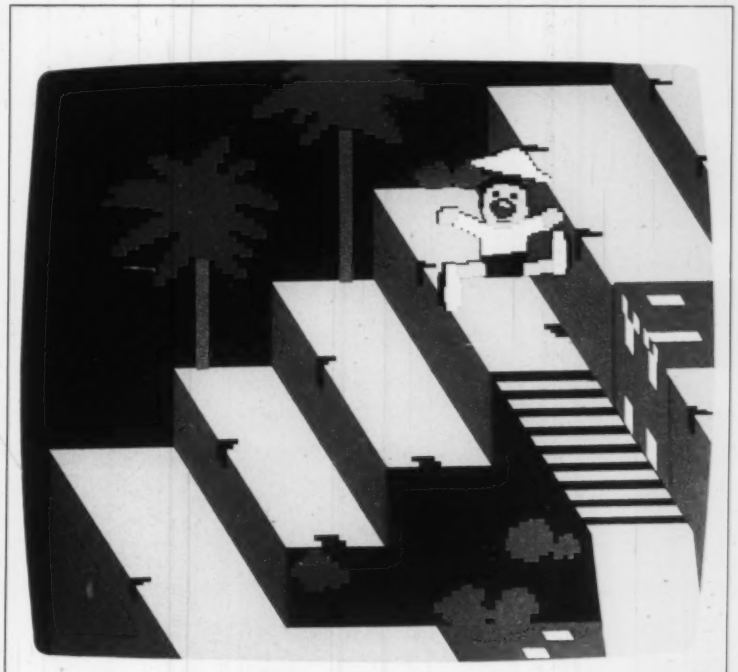
This is the game I have been waiting for. I first saw the home version of *Pole Position* at the Consumer Electronics Show in June 1983 on the Atari 5200 game machine. I knew that inevitably it would make the transition to the computer so I waited patiently. Now, it is here.

The Atari computer version of *Pole Position* is much like the arcade version upon which I originally became hooked. The major differences are that there is no female voice announcing "Prepare to Qualify," and the billboards spaced along the race track lack advertising messages. The billboards on the arcade version with the Atari logo and advertisements for Centipede and Dig Dug added to the cuteness coefficient of the game but their absence is not a serious flaw. Also, control of your Formula 1 race car is via joystick rather than a steering wheel.

As the game begins, a blimp passes

Pole Position

across your view towing a sign that reads, "Prepare to qualify." The musical fanfare "Thrill of Victory, Agony of Defeat" is heard and you are off. A joystick is used to move your car left and right. Forward and back selects low and high



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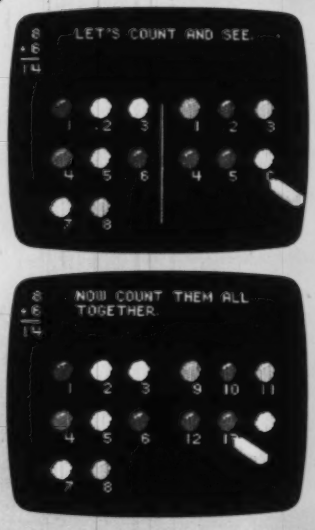

The Professor uses colorful graphics to provide children with an identifiable illustration to convey an abstract idea.

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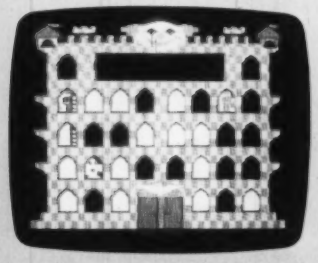

After each correct answer a player moves closer to capturing the key from the ghost and leaving the castle a winner.

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Actual photographs from Commodore 64.

SOFTWARE PROFILE

Name: Pole Position
Type: Driving game
System: Atari
Format: Cartridge
Summary: The best driving game on the market.
Price: $49.95
Manufacturer:
Atari
1265 Borregas Ave.
Sunnyvale, CA 94086
(408) 745-2000

gear, and the button is your brake. A paddle controller would be much easier to use and more natural, but you soon get used to the joystick.

You have 73 seconds to complete the lap and qualify for the race. Depending upon how well you do, you are placed at the starting line with seven other cars. The coveted position of first, also known as the Pole Position, is reserved for players with a qualifying time of less than 58.5 seconds. I have yet to attain anything better than a starting position of third.

The "Christmas tree" starting lights signal the beginning of the race, and your goal is to complete the circuit in the shortest time. As you pass other cars, you can hear the roar of their engines and rack up bonus points. However, taking a turn too fast will result in, at best, loss of valuable time as you spin out into the grassy area. At worst, you may hit a billboard or another race car and end up as a fireball. A hint for you "lead foots": when going around the corners, quickly downshift and then upshift again to reduce your speed slightly. Then, just barely move the joystick in the direction you want to turn. A nudge is all it takes.

As you tear around the course, the graphics provide an effect that closely resembles the feel of driving a race car. Clouds move across the sky; the background scenery changes; and a picturesque view of Mount Fuji is seen. Do not let the colorful graphics distract you. Intense concentration is needed to drive at your very best.

If you complete the first race lap in the time allotted you earn extended play. Forty-five seconds are added to your time, and you may continue the race. You gain additional time for each lap you complete, and you can continue to race as long as you have unused time. Finally, you see the checkered flags, and the race is over.

The sound effects as you race around the course and up and downshift are excellent. And, of course, the graphics are sensational. *Pole Position* for the Atari computers is a winner. I give *Pole Position* the pole position for computer race games.

CIRCLE 415 ON READER SERVICE CARD

Starbowl Football

There is good news for Atari computer owners who are also football fans. Gamestar, makers of the excellent *Star League Baseball* game, now has a computer football game. Called *Starbowl Football,* and written by Dan Ugrin and Scott Orr, this is probably the best football adaptation yet for the Atari computer.

One complaint I have with other computer football games is that there is no provision to play solo against the computer. Normally, that is not a big problem, but sometimes a human opponent just cannot be found. Now, thanks to *Starbowl Football,* I can play a leisurely game against the computer anytime I want. This not only lets me enjoy a gridiron conflict in the privacy of my own home but it allows me to get some practice sessions under my belt for when I go head to head against another human.

SOFTWARE PROFILE

Name: Starbowl Football
Type: Sports game
System: Atari
Authors: Dan Ugrin and Scott Orr
Format: Disk and cassette
Language: Machine language
Summary: NFL action on the Atari.
Price: $31.95
Manufacturer:
Gamestar
1302 State St.
Santa Barbara, CA 93101
(805) 963-3487

First, let me give you the stats on the game. It features excellent scrolling graphics and a full 100-yard field. The smooth scrolling of the playfield back and forth to follow the action resembles that of a panning television camera from high atop the stadium in the press box.

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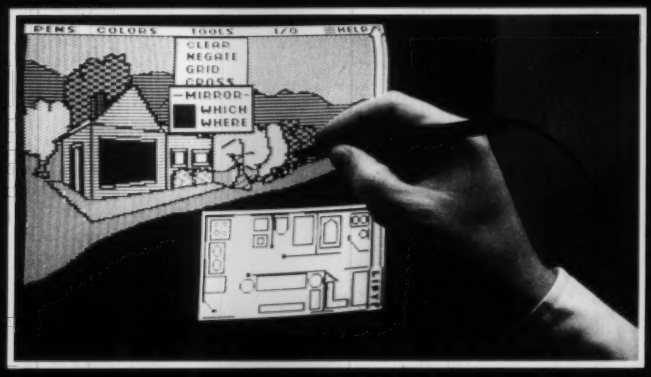

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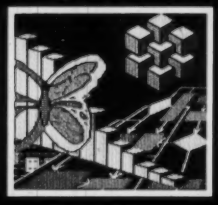

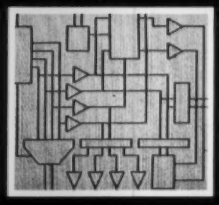

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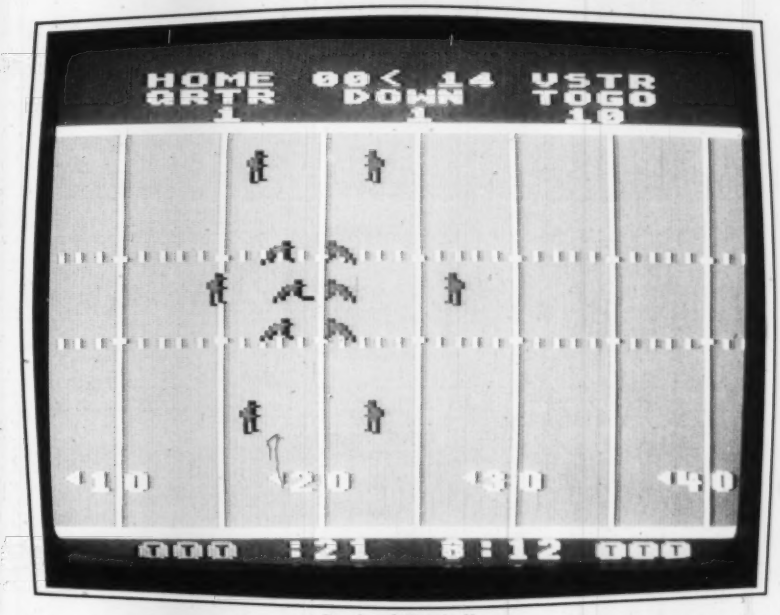

Starbowl Football

You call each of your own plays from a variety of 132 offensive and 54 defensive play alternatives. Many of the features of football, such as fumbles, off sides, and pass interference, are built into the game.

This game has class. At the start of the game, all of the players line up as the National Anthem is played. Next, they line up for the opening kickoff. There are six men per team. The defense has a top and bottom cornerback, three defensive linemen, and a free safety. The offense consists of a top and bottom receiver, three offensive linemen, and the quarterback. Player 1 always kicks off at the beginning of the game. Player 2 or the computer, kicks off to start the second half.

After the ball is kicked, the field scrolls in the direction of play. The kick returner catches the ball and turns black to indicate that he has possession of the ball. The offense maneuvers the ball carrier up the field until he steps out of bounds or is tackled. At that point the whistle blows, and the clock stops.

The offensive player has full control of the quarterback and can program him for four pass patterns: fly, square out, slant in, and screen. Only one of the receivers can catch the pass, and this eligible receiver must have been chosen before the play. Although passing is more fun, a good run can earn a half dozen yards for the quarterback. Four blocking assignments can be made: sweep top, pass protect, sweep bottom, and tarp middle. Pass patterns and blocking assignments are made with the joystick.

The defense directly controls the free safety. The pass coverage of both cornerbacks and the rushing assignments of the defensive line are also programmed with the joystick. On a rushing play, the computer automatically sends the pass defenders after the ball carrier. If the ball crosses the path of the free safety, an interception may be attempted by pressing the joystick button.

During the huddle, the scoreboard is displayed showing all of the necessary information needed for play. Quarter, down, yards to go, ball possession, and score are clearly indicated. The game clock, 30-second play clock, and number of remaining time outs are also displayed. All of this information is there when it is needed and presented clearly.

Starbowl Football provides good football playability. The outcome of each game depends upon the abilities of the players rather than on chance. The only criticism I have of the game is that the computer opponent is so good. My loss record against the computer rivals that of the New York Giants. But with practice and a lot of patience you may be able to send your video squad to the Super Bowl. And if you can beat the computer by 14 points and document it, Gamestar will sign you up for the Starbowl Allstars. Good luck; you will need it.

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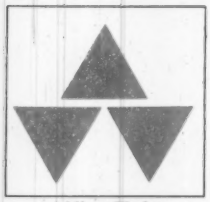

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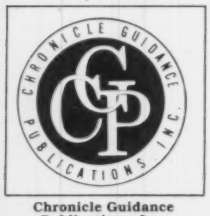

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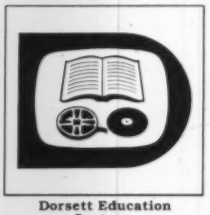

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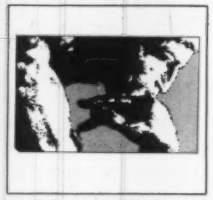

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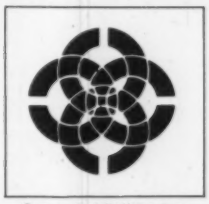

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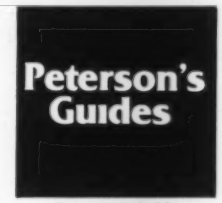

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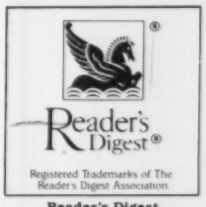

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CIRCLE 161 ON READER SERVICE CARD

UNDERCOVER CONSUMER

Editorial Espionage Reveals the Perils and Pleasures of Buying A Personal Computer

Betsy Staples and John J. Anderson

It is two weeks before Christmas. Activity in the department store is frenetic. As we stroll through the camera/computer/electronic keyboard department, we overhear a salesman trying desperately to sell one of the discontinued TI 99/4A computers with which he is undoubtedly afraid he will soon be stuck. Let's listen to the rest of the conversation.

Customer (indicating a Commodore 64): What about that one over there?

Salesman: Well, that one is all right too, but with this one you get what we call "software." You see, the cartridge plugs right in this slot here. With that one you need a disk drive because you have to write your own programs. And that's expensive. With this one you don't need anything else...

Horrified, we are unable to remain silent as one of our fellowmen is led to the slaughter. We interrupt:

CC (indicating cartridge slot of C64): If this computer doesn't use cartridges, what is this for?

Salesman (confidently): Oh, that's for add-ons. But let me show you ...

That was the moment at which the idea for this article was conceived. How many innocent neocomputerists were making important and expensive decisions based on false information? How many salesmen were as ignorant or unscrupulous as the one we had overheard? We thought times had changed since our first Mystery Shopper article in the spring of 1979, but perhaps they hadn't. We had to know.

So, one day in March between snowstorms, we disguised ourselves (not too cleverly) as a young suburban couple in search of the ideal computer. We were Andy and Betty Johnson, parents of two bright young children (we had to say they were bright or the salesmen would have become suspicious), Timothy, age 10, and Pennington, age 5. Andy, we decided, would be a marketing executive at a large communications company in the area, and Betty would be a freelance writer. We wanted a computer that could handle serious word processing, spreadsheet analysis, and educational programs.

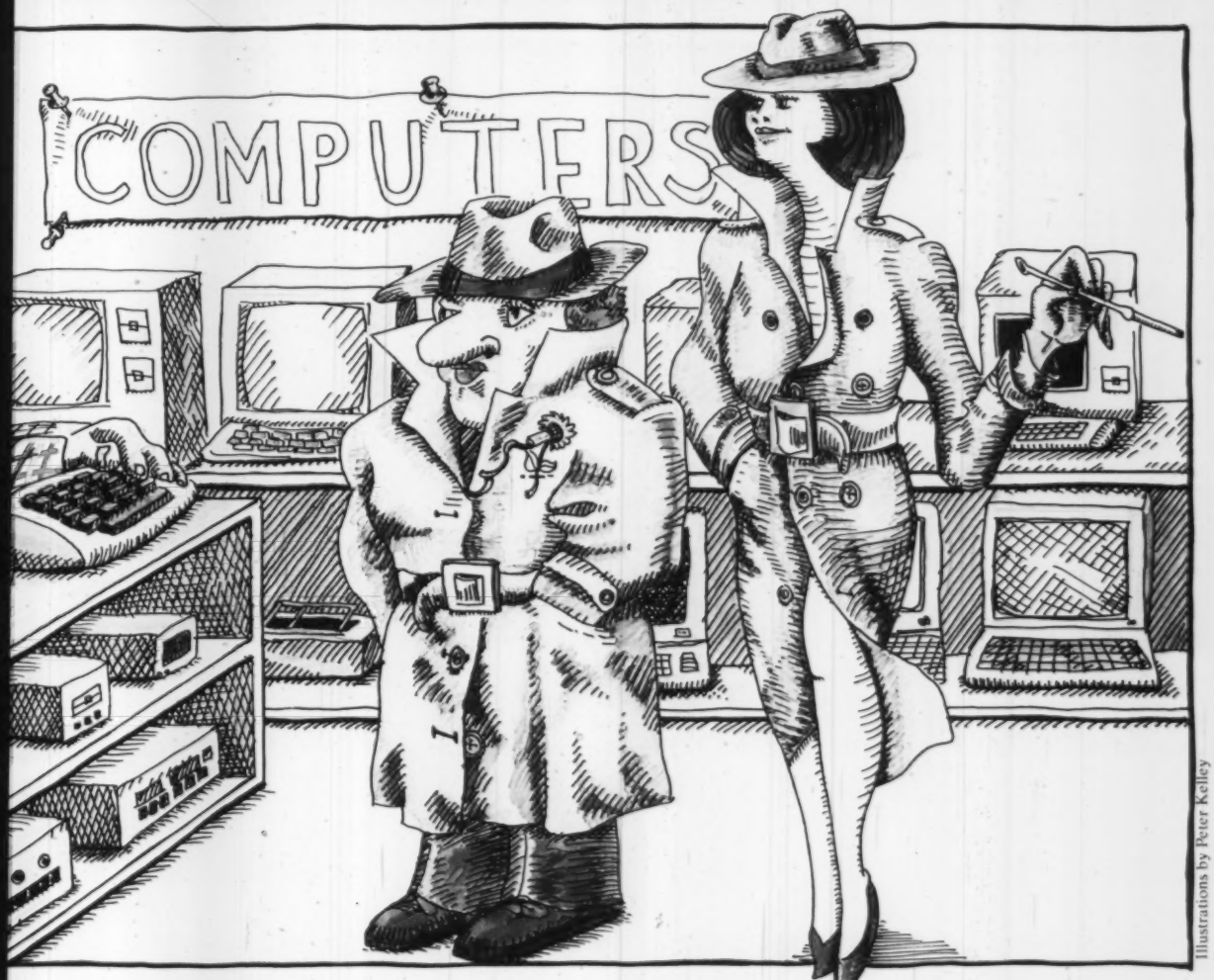
Prodigious Information at Prodigy

Our first stop was Prodigy Computer Center in East Hanover, NJ. We walked in the door and barely had time to pick out "The quick brown fox..." on an IBM PC keyboard before a salesman was upon us. "Hi, folks. What can I do for you?"

Somewhat timidly, since we were newlyweds, we stammered, "we think we're looking for a computer, but we don't really know what kind."

He took the bait: "Well, first of all, my name is Danny. Welcome to our store." He told us that computers were becoming "a way of life—almost a necessity these days."

Then he made the statement that we had heard ourselves utter so many hundreds of times over the years: "First of all you narrow your choices by deciding on your applications, and then you narrow it further



Illustrations by Peter Kelley

by deciding on your price range." We listed our proposed applications, starting with word processing.

"There are various levels of word processing," Danny explained. "You can buy a complete word processing setup for as little as $2500 or you can buy one for $6000. Obviously, there's a difference..."

Andy blanched convincingly. "$6000 is out-right out of the ballpark. We're talking $2500 to $3000 max."

"Ok, then, what else do you want to do?" asked Danny, undaunted.

We told him that educational applications were a high priority.

"It's very important that I know that kind of stuff, because there are machines that don't have that kind of software. Like the IBM PC has very little, where the Apple IIe has thousands and thousands of educational software packages.

"It's a very fine machine simply because there is so much available for it. You can tailor the machine for your needs; you can get a package for anything from dog grooming to sheep herding. Half the stuff you see around here is Apple software. And it's a very expandable machine. Let's take a look at it."

We walked over to the Apple, which was displaying a syntax error, and Danny launched into a balanced discussion of printers and convinced us that we needed neither letter quality nor friction feed.

"You're talking about a one-drive system with a printer for about $2000."

"Do we need two disk drives?" Andy asked.

"Some applications require two drives, but word processing and spreadsheets you can do with just one. However, your optimum system is this right here. It's a two-drive system with 128K and a monitor for $1795. Then you would just tack on whatever kind of printer you wanted and your word processing and spreadsheet programs. It would be just about $3000 with software."

We asked about the future of the Apple and gave Danny a chance to steer us to IBM by saying that we had heard that the educational software situation was changing. He wouldn't bite.

"It's a $5000 machine. There just aren't that many of them in the home. It isn't the thrust of the machine."

"What about the baby IBM?" we inquired.

"Well, that machine really isn't geared for word processing," he answered. "If you know how to type, you'll go berserk with that thing."

"What about the new Apple" we asked, feeling ornery. "Isn't that going to replace the IIe? Everybody seems to be going crazy about that machine."

Patiently, Danny walked us over to the Macintosh and gave us an impressive demo. "The only flaw with this machine is that there is no educational software and probably will not be for a while. Again, the thrust of this machine is the business market."

We discussed at length the possibility of buying a Mac for Dad and "something really cheap" for the kids, but came back to the idea of one computer to do everything—an Apple IIe to do everything.

"Yes, but this seems light years ahead of the IIe," Andy lamented.

"It's light years ahead of everything

else we have in the store, but you have to sit down and say 'Well, right now all I can do is graphics and word processing and *Multiplan*.' "

"But I'm really taken with this machine; we're going to have to give this some thought," Andy said.

"You're about to say 'the heck with the kids,' aren't you?" asked Betty in an accusatory tone.

"I sure am," he muttered. "We're going to have to get back to you on this, Danny."

Poor Pitiful Paul

Across the road at a Radio Shack Computer Center we made the acquaintance of Paul, a young salesman with a scraggly mustache and gravy stains on his tie.

Again—this time with a great deal more confidence—we described our needs. Deftly sidestepping the question of educational software for a five-year-old, Paul led us to a TRS-80 Model 4.

"Now, you mentioned *VisiCalc*, which is why I showed you this machine. This is more or less the most compact machine that will run all the applications you've talked about, and it happens to be on sale this month—I'm on page 22 of the catalog—for $1799.

"There is also a one-disk version. As far as the applications you mentioned—word processing and spreadsheet—those will all run on one disk. The second disk is nice to have for making backups."

We talked a little more about our needs, establishing firmly in everyone's mind that while our computer was not going to be used in an office, we did not want to buy a toy. We reminded Paul that one of our priorities was educational software for our youngsters.

"Let me treat the kids first, then," he volunteered. "The real avenue to go with kids—what they teach them in school—is the programming language called Basic, and this machine runs Basic. We have some pre-programmed Basic courses that run on this machine. Also there are lots of books, and we have classes here.

"But for word processing, you don't have to know any programming. The word processing package is called *SuperScripsit.*"

Paul then turned on the Model 4 and, after a few false starts, loaded *SuperScripsit* from the Winchester drive. He went quickly through the startup procedures and then called up his demo document, which was set up in two-column format. We noted that at no time did he offer to demonstrate the editing features of *SuperScripsit.*

"Now let's print this out," said Paul, leaning over to turn on the attached printer. As the printer hummed away, Paul assured us that we could learn word processing in "an evening or two."

Then, suddenly, the demo fell apart. The printer paper had been loaded incorrectly, and Paul's tidy columns were printing on top of each other and totally out of alignment.

Trying to regain his composure, Paul assured us that the source of the problem was that the last person to use the printer had adjusted the tractors improperly.

"Anyway," he continued, "the purpose of that particular document was to show how it scrolls back up to the top of the page and prints the second column—which it didn't do."

"Anyway, the purpose of that particular demo was to show how it scrolls back up to the top of the page and prints the second column—which it didn't do."

Paul decided to cut his word processing losses, and shifted the discussion to spreadsheets, pointing out that there were two available for the Model 4.

"*Multiplan*," he told us, "includes quite a few improvements over *VisiCalc*." He went on to build a convincing case for the superiority of *Multiplan* over *VisiCalc* in terms of user-friendliness, which, he allowed, did result in a slight loss of speed when compared to *VisiCalc*.

Our discussion of speed and user-friendliness led us naturally to Betty's request that Paul compare the Model 4 with the Apple IIe.

"I don't know the Apple II that well," responded Paul, with a great deal less embarrassment than was warranted.

Andy told him that we had just looked at one, and that it was in the same price range as the Radio Shack machine.

"Yeah, this machine is our entry in that market, for sure," said Paul hesitantly. "The Apple has external drives, if I'm not mistaken. It's all one unit, right? You have the monitor on there and everything," he stammered, missing a perfect opportunity to offer a comparison of the 40-column Apple screen with the 80 columns standard on the Model 4.

Regaining his composure again, Paul redeemed himself by reiterating the all important consideration: "When comparing computers, the most important thing is to look at the software."

But he floundered again when he suggested that "from a strictly technological standpoint, they are compatible machines. How much memory comes standard on the Apple?" 64K, we told him.

Dropping that subject instantly, he moved on to a discussion of "RS-232, a port for communicating with other computers, either by the phone or hardwired. I don't remember if the Apple has RS-232 standard; I think it's an add-on. In the case of this computer, if you buy the two-drive system, it is included. With the one-drive system, it is a $100 add-on."

Changing gears again, Paul reiterated the importance of software. Andy responded by mentioning the large number of educational packages available for the Apple.

Paul opened the catalog to a page of game software, and pointed out that "this is probably not what you mean by educational software." We agreed.

Fumbling through a few pages of the catalog, he came at last to the education section and noted that much of what we saw advertised there was intended to be used in the classroom. Betty pointed out some Sesame Street programs that she thought would be good for little Penny. Paul agreed, and then noticed that those packages were available only for the Color Computer. "Why don't you just take the catalog home and study it," he suggested.

Another quick change of topic and we were listening to the virtues of Radio Shack service. "I don't know much about Apple's marketing," he admitted, "but when you buy a Radio Shack product and Radio Shack software and a Radio Shack printer, we owe for the life of the equipment—which is esentially forever—to help you with it; to answer questions, be they about malfunctions, which doesn't happen often, or just user problems.

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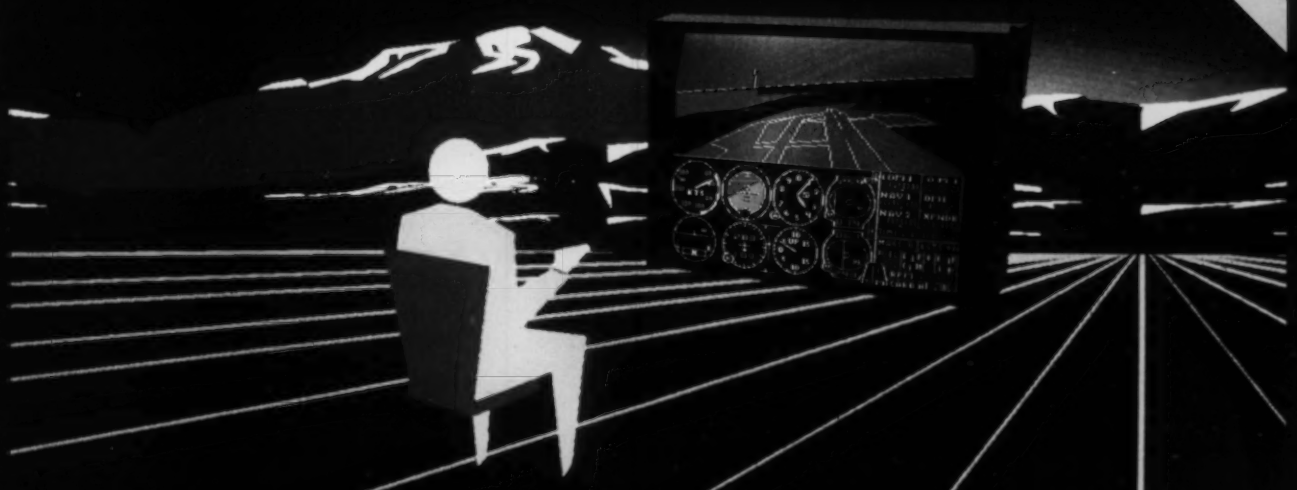

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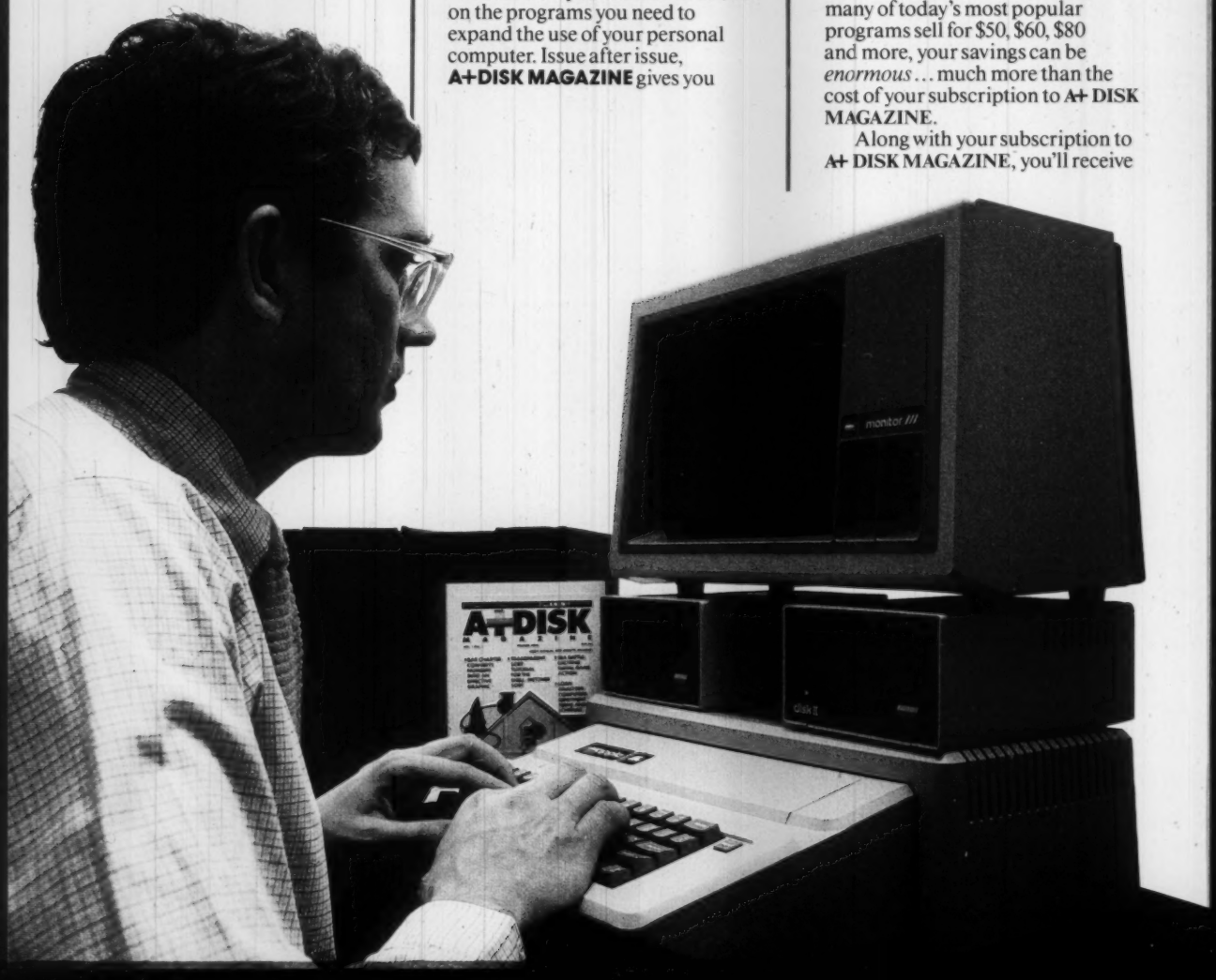

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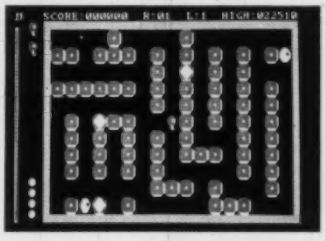

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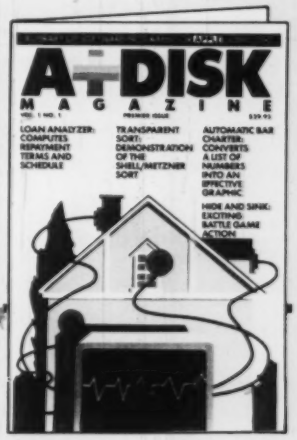

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have a problem, you dial area code California; you get 'I'm sorry, all our lines are busy...' ".

He went on to describe the service facilities at his store, which included not only himself, but a full-time customer service representative "whose job it is just to support technical and software questions. And if he can't answer your question, he, then, makes the long distance call for you."

After a brief digression during which we learned that the Model 100 was definitely not for us, Paul asked us to have a look at a printer that would be better suited to our needs than the long-carriage model attached to the Model 4.

"And besides, this one eats paper," quipped Betty.

"No, no! Let me explain again what happened," said Paul with a note of hysteria in his voice.

He did explain again the problems of two-column printing and then offered to show us a sample of the word processing mode print of a smaller dot matrix unit. But after much fussing with paper and producing something that resemble a moiré pattern, Paul blamed the same gremlin who had foiled his earlier demo, and we said we could discuss printers another day.

After we purchased some batteries to power our hidden tape recorder, Paul gave us a business card with the name Peter Olson crossed out in pen and Paul White written in below.

"I'm Paul. If you have any questions..."

"You're not Peter Olson?" interrupted Betty.

"No, I'm not. For some reason he rates cards because he's not here, and I don't because I am."

As we were walking out the door, we noticed and commented on a package containing a TRS-80 Color Mouse. It was then that Paul made his only meaningful comment on his competition.

He implied that mice are highly overrated and asked if we had seen the Macintosh. Andy's eyes misted over as his sighed, "Yes. Prodigy had one."

"Well, if you're going to do a lot of typing, think about having to take your hands off the keyboard to move the cursor around."

We hadn't thought about that, and when we did, the Macintosh lost some of its appeal.

Paul closed by reminding us that we would certainly want to make our decision by the 31st of the month so we could take advantage of the sale on the Model 4. We assured him that we would.

K-Mart Marvin Tells It Like It Is

Slightly disappointed that we had not yet been given any really bad advice, we pushed on to our local K-Mart where some people will think we got the best advice of the day.

We sauntered up to a working TI 99/4A, and Andy asked "Can we get a terrific buy on this?"

"It's not for sale," grumbled K-Mart Marvin from behind the counter. "This is used for demonstration of software. It's the last of the Mohicans. But Texas Instruments is considering reinstating their product."

"You're kidding!" we chorused.

"I wouldn't lie to you, sir. Maybe, perhaps an improved version or a little more professional. It was one of the best of the home computers."

"This is used for demonstration of software. It's the last of the Mohicans."

"No kidding," said Andy, careful not to give away his editorial status by flaunting his vocabulary.

"Because, you see, if you are familiar with economics, they have what is known as the Peter Principle—people are promoted up to their level of incompetence. And they had it at Texas Instruments—incompetence. They had a good product and they didn't know how to handle it."

"Well, we are interested in buying a computer," said Betty, "If you won't sell us that one, what else can you show us?"

"Let me tell you about all of them; by the time I finish, you'll be in tears.

"Commodore products have 20 to 30 percent returns—you sell 100, 20 to 30 come back."

"Is that figure based on your own experience?" we asked.

"No, it was a *Wall Street Journal* survey."

We asked how his experience corresponded with that survey.

"Twenty to thirty out of a hundred—if not even more. So you may get a good one..."

"Do, we get to run through as many as we need?" asked Andy with a grin.

"You get a 30-day guarantee. Some people buy them, but after the guarantee we don't know what happens. Because most people—I would say 75 percent—buy them on an impulse. They think they want it and they don't know what they're buying."

"Is that us?" Andy asked Betty.

"Oh, I think we're convinced," she replied. "We want one."

"Yes, we want one, but we don't know what we want."

Marvin grabbed the bait and spit it out: "I would bide my time, since there is no immediate rush. There was a big demand over the holidays, and they evaporated most of the items they had in stock, so now they are trying to get replacement models for them.

"But I would say that as time goes on, they'll gather a little dust, and they'll probably start giving rebates and discounts. So I would bide my time; new models come out all the time.

"I would get a better quality product if I could. Why buy something for $200 and have a headache when you get something for $400 that's trouble free?

We asked about the Atari computers that were running at the other end of the counter.

From behind Marvin a woman who had been engrossed with an adding machine piped up. "Do you know how to compute now?"

"No, we're just getting started. We want to get a computer."

"I'm telling them about 20 to 30 percent returns."

"But what about the Atari?" Betty insisted.

"I think they are overpriced. We never had too much success on the Atari," opined the ever-optimistic Marv.

"The Atari doesn't even come with the Basic language. You have to buy that. It doesn't really have that much," volunteered the woman, whose name badge we couldn't read.

Having laid to rest any notions we might have had about buying an Atari, Marvin and the woman mused about the 99/4A and speculated on the possibility that it might be available at 47th Street Photo in New York.

Trying to get the conversation back on track, Andy asked about the price of the Vic 20.

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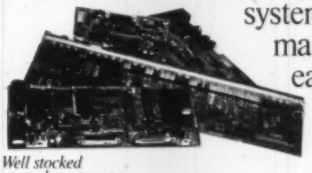

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because when you use the accessories it uses up about 32 of the K out of the 64."

"Well, thanks for your advice," Andy said. "I guess we'll wait a while."

"Take my advice," said Marvin, "spend the money on yourselves."

"But they want to compute," wailed the woman from the background.

"No, no. They don't need it," said Marvin, raising his voice for the first time in 15 minutes.

Leaving the salespeople to squabble in peace, we slipped into the crowd of K-Mart shoppers and bolted for the door.

Adam and Steve

Our next stop was Bamberger's, a local department store chain. At the store in Livingston Mall, we found computers adjacent to the portable typewriter counter.

We saw a Pet 64, a Commodore 64, and a Coleco Adam—the only one we saw in our travels. There was a poster extolling the virtues of Atari computers, but there was no Atari in sight.

Nor was there a salesman in sight. So we tried to attract attention by turning on the Adam and typing on the platen by pressing the numbers on the keypad. The condition of the platen told us that we were not the first shoppers to while away the hours in this manner, but the sales staff remained unconcerned.

After 10 minutes of fussing with the Adam and the 64 trying not to look as if we knew anything about them, and listening to a dozen kids play "The Entertainer" with varying degrees of lack of skill on the nearby Casio keyboards, we went to the typewriter counter and asked if anyone could tell us something about computers.

"That would be Steve," replied the only salesman in sight. "He just stepped away. He'll be right back."

Ten minutes later, we still had seen no sign of Steve, so we headed for greener pastures around the corner at Bamberger's full fledged Computer Center.

There we met Norm to whom we told our by now very well rehearsed life story, and asked for his advice.

He wasted no time in ushering us to an Epson QX-10—the first we had seen that day.

A man of few words, Norm rattled off the features of the QX-10 and told us we could have it all for $2995.

"That would take care of what you want to use it for, except, of course, for buying educational software and a spreadsheet for it."

"Is there much educational software for it?" asked Betty.

"It's just starting to come through now. We have a shipment of Acorn educational software coming that should be here today. But for $2995 you get all that, so it's really the best dollar value."

Eyes misty again, Andy interrupted, "I can get a Mac for $2995."

"With the Mac for $2995, you get a portable, much smaller screen, one disk drive, and 128K of memory. You also get *MacWrite* and *MacPaint*, but no educational software. And I couldn't sell you a Mac for another eight weeks.

"The thing about the QX-10 is that it comes with a lot of power. It's expandable; you can buy in the next couple weeks the IBM expansion board that will enable it to run IBM software for $395.

"It's fine, I guess, for kids, to do educational stuff. But not for word processing just because the keyboard is horrendous."

"Every Epson customer I have is waiting for that board to come in. Because I think this hardware is much better than the IBM."

We asked about the printer that would come with the Epson, and Norm led us over to an MX-80FT that was hooked up to a PCjr.

"I guess we don't want one of these," said Andy pointing to the jr.

"I don't recommend the PCjr to *anybody*. The only people I have sold PCjrs to are people who come in and say specifically, 'I want to buy a PCjr.' If I have to recommend something, I don't recommend the PCjr. It's a very difficult machine to make good use of.

"It's fine, I guess, for kids, to do educational stuff. But not for word processing just because the keyboard is horrendous.

"And it will never go past one drive. And it will never go past 128K. And it's still expensive. You don't get Basic; you don't get the disk operating system. If you want to hook it up to your TV set, it will cost you $1500 just to walk out of here."

Getting back to the business at hand, Betty asked Norm to compare the QX-10 to the Apple IIe.

"The QX-10 is a much more powerful machine; the IIe has more software available for it. But, of course, with the IBM expansion board for the QX-10, you have all the educational software for the IBM available."

We asked Norm about the Adam we had seen outside. He said that he thought that Coleco had solved the problems that had originally beset the Adam, but that now the problem was software. "They have absolutely nothing available today, and they're talking a couple of months before the next software package comes out for it."

As we walked over to the counter to collect a packet of literature Norm had for us, we asked what word processing program he would recommend for the Apple. He thought *PFS:Write* and *Applewriter II* were the best choices for our needs.

We collected our literature and left the relative calm of the Computer Center to continue waiting for Steve. After another 10 minutes, we concluded that Steve's last name was probably Godot and left.

Several days later, we returned to Steve's corner of Bamberger's to find that the Coleco Adam had joined Steve in Never Never Land. The stand was still there, but nothing had been brought in to take its place. This time we didn't bother to wait for Steve.

Computers: Games or Gadgets?

Just outside of Bamberger's on the main level of the Mall, we noticed Games and Gadgets, a small video store. They had Commodore and Atari computers on display along with game systems and vast quantities of game software.

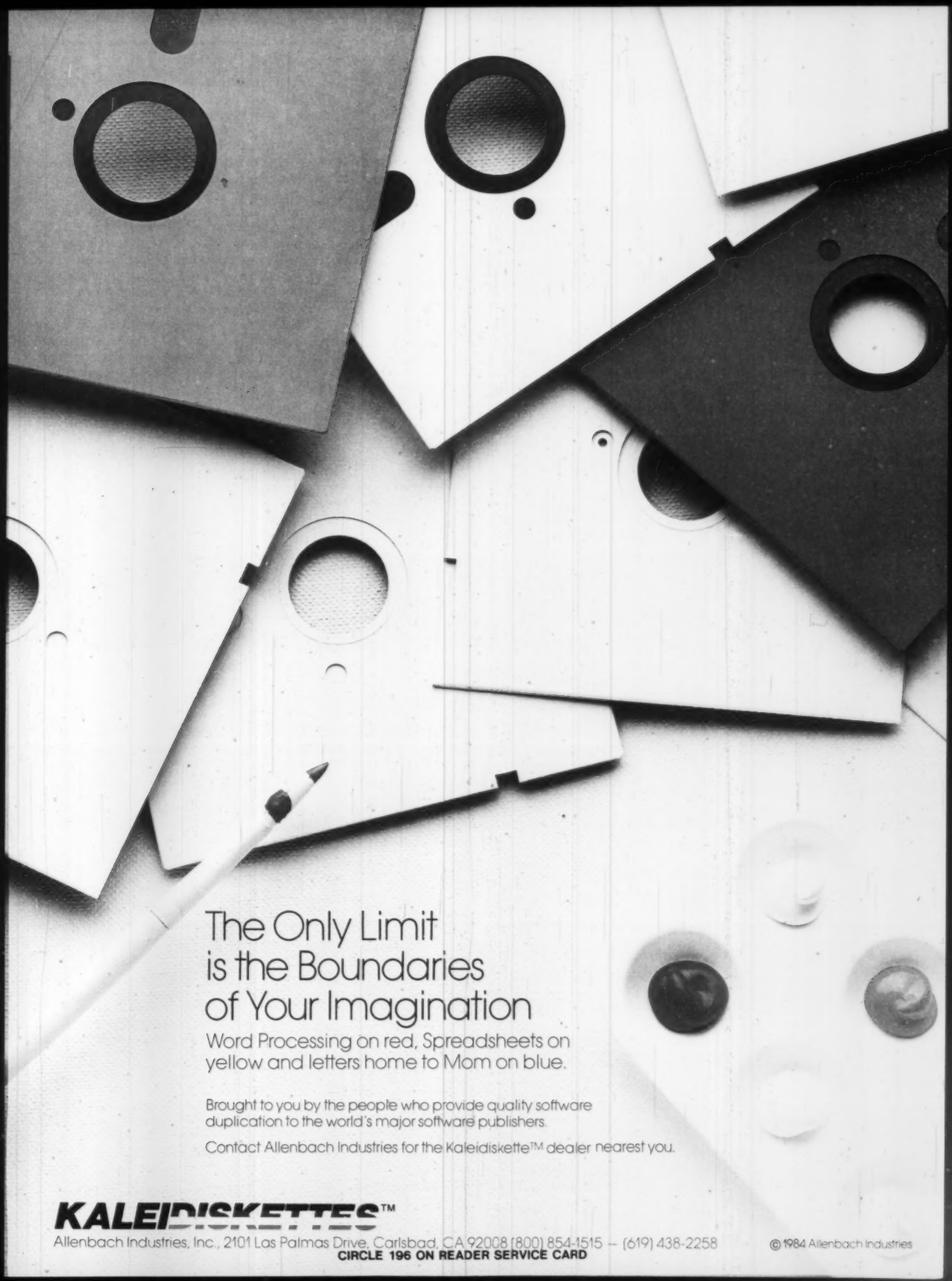
We entered and once again told our story to the saleswoman. We asked for her recommendation.

"I'm personally using a Commodore 64."

"And doing all those things?" Andy asked incredulously.

"Yes, I have a *Bank Street Writer* program that does just about everything you want. And my kids play games on it—just about every game you could want is available for the Commodore 64.

"There is a spreadsheet for it, but I don't use it, so I don't know much about it."



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CIRCLE 196 ON READER SERVICE CARD

"We've heard some scary things about the C64," said Andy.

"Like what?"

"Like they don't work."

"Some don't; some do. But anything electronic is that way. If it doesn't work, you bring it back and get another one.

"The Ataris are good, but they are limited, because the Basic language in Atari is more different than Basic in the Commodore 64. I taught myself Basic on the Commodore 64, so it's fairly easy to learn. It's fairly sturdy; the kids don't seem to be able to do too much to it..."

We asked about the TI 99/4A that was running nearby.

"If you can get your hands on one, it's a good buy," she replied. "It's an excellent computer—no question about it. The problem with TI is that its language is also very specific to TI and not easily transferable to another computer.

"There is lots of software for it; lots of people are now making software for it. But Texas Instruments is no longer making the computer.

"Somebody else is going to pick it up, but no one has yet."

We seized on this bit of intelligence and asked for clarification.

"Oh, yes, somebody is going to. Definitely. No question about it. The patent has already been sold, but we don't know to who yet. And Texas Instruments right now is sitting on three million chips for software, so there's going to be plenty of software."

We looked at printers for a moment and remarked on the low prices of the units on display. The saleswoman told us that they did not carry expensive models because they did not have that kind of customer.

"If you really want to get sophisticated," she said, "I'd say go to the IBM PC—not the PCjr, the regular PC."

She closed by saying that her colleague, who had been fidgeting with the C64 while we talked, was very knowledgeable and would be glad to answer our questions when he was free.

Gem of a Salesman

Further on down the Mall we stumbled into Gem Electronics, where we saw Atari and Commodore computers in a glass display case near the front of the store. The price tags on the machines carried the full list prices. We went over to the cash register where the only two employees in the store were standing and described our needs.

One of the young men behind the counter replied, "Well, the Commodore has a couple of advantages, one of which is cheaper hardware. For the word processing, you will need a printer and disk drive, and you'll save a little over $200 on the hardware.

"And the Commodore word processing program is supposed to be excellent. It's supposed to be one of the easiest to use.

"The advantage of the Atari is software availability."

From the other end of the counter, his colleague disagreed. "Actually, now it's going the other way; there's more for the Commodore."

"What about educational software?" Betty asked. "Which one would have more?"

"Probably the Atari," he replied.

Silence fell between us, and after a few moments of awkwardness, we thanked him for his time and pushed on to Sears.

"Either ComputerLand has done one heck of a sales job on that woman, or she's using the boxes for Christmas tree ornaments."

Seared at Sears

Like Bamberger's, Sears had its computers on display alongside the typewriters and cameras. There in the case, next to the Polaroids and Canons, we saw Ataris, Commodores, and a naked TI disk drive.

We engaged in an animated discussion of the computers, hoping to attract the attention of the overweight adolescent in charge of the small section. When, however, after 10 minutes she had failed to so much as acknowledge our presence, we concluded that her commission on film sales was larger than her commission on computers and left.

ComputerLand #1—Or Is It?

The ComputerLand in Morristown, NJ, was the first ComputerLand franchise in the nation. Creative Computing has been doing business with them off and on for years, and our experiences with them led us to approach this last store on our journey with something less than optimism. But we hadn't been in the store for quite some time, so maybe things had changed.

Before we even entered the store, we noticed a woman with a car full of Compaq computers. Every cubic inch of the car, except for the driver's seat was occupied by Compaq boxes. "Either ComputerLand has done one heck of a sales job on that woman, or she's using the boxes for Christmas tree ornaments," joked a very weary Andy.

Once inside, we realized that times really had changed. Most of our differences with ComputerLand had been over repairs and nonrepairs of our Apples. Now the store that we once suspected of having its interior decoration done by the marketing department at Apple looked more like an office automation center; Apple computers were conspicuous only by their absence.

We ambled over to a Compaq, and while we were admiring its sleek lines, Kathy came over and asked if she could help us.

"We think we want to buy a computer, but we're not sure which one."

She scored big points by immediately asking what we wanted to do with it and refining our answers. Then she made her recommendation: "I would suggest either a PC or a Compaq; Compaq is the IBM compatible."

"Is that what this lady is buying 20 of?" asked Andy, pointing to the woman who was trying to cram still more computers in her car.

"They are for AT&T. They bought 200 of them."

For a moment it looked as if our decision had been made for us. With a recommendation like that, how could we consider anything else? But we decided to see what Kathy had to say about the various machines in the store.

She described the Compaq with 256K, two disk drives, and IBM compatibility, "which means that any software that runs on IBM will also run on the Compaq, and as far as software goes, there is the most out there for IBM."

"Including educational software?" asked Betty, feeling like a broken record. "Someone told us that the most educational software is available for the Apple."

"That might be true," answered Kathy, "but there are literally hundreds of packages out there."

A WORLD APART FROM THE ORDINARY

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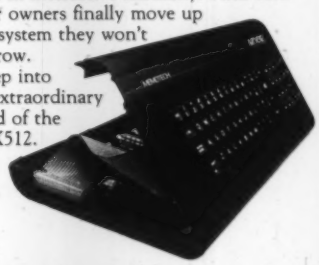

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MEMOTECH
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NewWord ™ is a trademark of NewStar Software Inc. CP/M is a trademark of Digital Research, Inc. *DMX80 suggested retail price $395. **Suggested retail price.

"But why would we buy the Compaq instead of the IBM?" Andy wanted to know.

"No reason," said Kathy, "unless the portability means a lot." She went on to explain the complexities of the IBM monochrome and color monitors and the necessity of deciding in advance whether we wanted to do graphics on our machine.

We then spied the PCjr on the other side of the store and asked whether it would be reasonable to consider that.

"If you want a spreadsheet, that's probably out, and there's not that much software available for it yet. The more you use a computer, the more you discover that you can do with it, and you just couldn't do much with that. And a full blown PCjr costs about $2900..."

"I thought it was $700," said Andy incredulously.

"Oh, that's the entry level system, which would be fine for little kids or to play games, but that's about it. If you're going to spend $3000, spend another $500 or $600 more and get a regular PC."

We then looked at the HP 150 with its touch screen, and Kathy gave us a abbreviated demo, confessing that the machine had been in the store for only a short time and she was not very familiar with it. She seemed to think that it was a good machine, but she didn't try to push it.

As we made our way to the door, Kathy whipped out two spec sheets—one for the Compaq and one for the IBM PC. The one for the Compaq was simple and straightforward: $3595 for the computer plus $595 for the printer for a total of $4190. Then she went over the IBM laundry list: $2104 for the 64K CPU with one disk drive; $595 for the second disk drive; $595 for the printer; $55 for the printer cable; $40 for DOS and Basic; $595 for the Quadboard; $680 for the color display; and $244 for the color graphics adaptor for a total of $4842. We began to suspect that the buyers at AT&T were on the right track.

Kathy wanted to know what other machines we were considering. We told her about Prodigy, and before Andy finished pronouncing the O in Radio Shack, she interrupted:

"Radio Shack. As far as support goes, I don't know how much I would count on them. They'll be there forever, but I just don't know how knowledgeable they are on the computer aspects.

"We have people who come in here and they say 'You're a few hundred dollars more expensive than Radio Shack.' We say, 'OK, then, go to Radio Shack.'

"Then all of a sudden they are calling us up asking for advice, and we say 'Fine, that will be $70 an hour for our consulting time.' "

On that encouraging note, we thanked Kathy for her time and staggered home.

So What?

So, what did we conclude after a long day of computer shopping? What do you need to keep in mind as you shop for a computer, whether it be your first, second, or tenth?

We concluded that while the state of the art in computer sales has not advanced quite as rapidly as the state of the art in computer manufacture, it has certainly made great strides in the past five years. With a few exceptions, most of the people with whom we talked knew the hardware they were selling. (K-Mart Marvin knew his hardware so well, he talked himself out of a sale.) All of them were able to make responsible comparisons of the various machines sold in their stores.

We concluded that the state of the art in computer sales has certainly made great strides in the past five years.

The most important thing that everyone with whom we spoke did right was ask the all-important question: What do you want to do with the computer? Then, having defined our needs, they made appropriate suggestions, being careful not to confuse us with information about machines that were not suitable.

They were all realistic about our needs and our financial limitations. Danny, for instance, did not push the Macintosh even though Andy was clearly smitten with it. He doggedly steered us back to the less expensive IIe because he was convinced that it was the right computer for what we wanted to do.

All of the salespeople, with the exception of those in Gem Electronics and Sears, were reasonably polite, articulate, and personable. They were eager to help but not pushy. Not a single one tried to force us to commit ourselves to a purchase on the spot, even though we told them all that we had made up our minds to buy a computer "very soon." And all of them gave us their undivided attention during the time we were with them.

There was very little disparagement of competitors. Most of the salespeople used what limited knowledge they had of their competitors to offer us as balanced a comparison as could be expected.

On the negative side: Perhaps the most serious flaw in the salespeople with whom we spoke was their lack of familiarity with the available software. While we did not expect each individual salesperson to be familiar with every software package for every computer in his store, we expected a bit more knowledge than we found. Most of them were completely at ease with the demonstration software running on their computers, but when it came to recommending something else, it seemed that each knew only one or two other packages to mention. Only Paul at Radio Shack offered any support for his software recommendations; with the others, we had the feeling that their suggestions might have been based on familiarity with a name rather than with a product.

In fact, we felt that software, in general, was given short shrift in all of the sales presentations. Danny and Kathy alluded to the added expense of software, but no one really urged us to allocate any of our $3000 computer budget for software. The rule of thumb we normally use in apportioning the cost of a complete computer system is: 70 percent for hardware and 30 percent for software. None of the salespeople with whom we dealt did anything to dispel the myth common among computer neophytes that software is—or at least ought to be—free. This is an oversight that could be at least as damaging to them and their stores as it is to the computer buyer. We often hear hardware compared to razors and software to razor blades, and these salespeople were all ready to abandon the blades in favor of the razors—a choice their employers might not have endorsed.

We also expected our salespeople to know their competition better than they did. Most of them missed at least one chance to point out the superiority of their product over a competitor simply because they did not know even the basic characteristics of the competing product.

Another area in which they fell short was the discussion of support. Paul at

Radio Shack and Kathy at ComputerLand were the only ones who even mentioned support. Perhaps the others hoped that we were naive enough to believe that manuals are intelligible and computers can stay healthy forever. Perhaps they thought that the mention of repair facilities would cast a pall over the discussion.

As we expected, the stores that specialized in computers had the best salespeople. Those that carried computers as an adjunct to their primary line of games or other electronic equipment had obviously not offered their salespeople any training in computer sales. Some of them, like K-Mart Marvin, had picked up enough information to be helpful to their customers, although not necessarily in the way their employers would have chosen. Others were basically useless.

We were very surprised to note that no one in any of the stores had anything good to say about the PCjr. Nor were the new Atari computers on anybody's recommended list. We wonder if manufacturers realize how much of their marketing effort swirls down the drain at the point of sale.

Yes, times have changed. You stand a better chance of getting good advice when buying a computer now than you did five years ago, but still the best advice we can offer is to know basically what you want before you go to the store. Find out as much as you can about the computers that interest you before you go to a store. Read magazines and talk to friends who have computers. Rely on these sources, too, for information about software; do not expect salespeople to be familiar with even a small portion of the software on the market. Then, armed with as much information as you can get, head for the nearest reputable computer store to put the finishing touches on your decision. CC

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What's New In Software

Softcon Off To Shaky Start

The first Softcon was held in New Orleans February 21 to 23, 1983. For many vendors and visitors, it will be their last.

On the final day of the show, the Softcon Show Daily said, "After a slow start, Softcon got rolling yesterday with attendance figures comfortably above management forecasts." If that was true, the management forecasts must have been revised downward several times. Last October, show organizer Jerry Milden was forecasting an attendance of 25,000; by January, the figure had shrunk to 10,000.

Although members of the press loved the show (they had plenty of time to talk to people), exhibitors were less enthusiastic. The ones to whom we spoke were happy to have to time to demonstrate their products, but admitted that their audience was largely other exhibitors and magazine representatives. Although some thought they would give it another try (after all, Comdex took several shows to really get going), many felt it was a waste of time and money and indicated that they wouldn't be back. —*DHA*

New at Softcon

Accounting Package from Champion Software

Champion Software has released its *Champion Accounting Software*, a five-module accounting package written in *dBase II*, for 16-bit microcomputers running PC/MS-DOS and CP/M-86. The five modules—general ledger, accounts payable, accounts receivable, inventory, and payroll—are interactive and feature real-time updating. The package includes a "recover" feature designed to rebuild your work if your computer crashes, and an extensive on-line "help" function.

CHAMPION SOFTWARE CORPORATION

Champion Software Corp., 66 South Van Gordon, Suite 155, Lakewood, CO 80228. (303) 987-2588.

CIRCLE 417 ON READER SERVICE CARD

Accounting and School Management Software

International Micro Systems has announced a nine-module *Financial Software Series* and a *School Management System* available for microcomputers running PC/MS-DOS, CP/M-86, and MP/M-86. The *Financial Software Series* consists of general ledger, accounts payable, payroll, accounts receivable, inventory control, invoicing, fixed assets, job accounting, and fund accounting.

The *School Management System* provides scheduling and record keeping for students and teachers and an accounting module geared for school finances.

International Micro Systems, 6445 Metcalf, Shawnee Mission, KS 66202. (913) 677-1137.

CIRCLE 418 ON READER SERVICE CARD

AndersonBell Software

AndersonBell has introduced *ABtab*, a tabulation package for the IBM PC and compatibles. The program, designed to help organize data into tables quickly, can be used to monitor quality control, evaluate employee performance, analyze marketing strategies, and perform other comparisons. *ABtab* can access information and create files in *dBase II* format as well as read and write ASCII files to other programs.

AndersonBell

AndersonBell also published a 32-page illustrated booklet, "In Search of the Wild Hypothesis," to provide an introduction to the science of statistics. This informal and somewhat humorous text conveys enough detail and information to give the reader an overview of basic statistical principles and their applications. AndersonBell also markets *ABstat*, a statistical analysis package.

AndersonBell, P.O. Box 191, Canon City, CO 81212. (303) 275-1661.

CIRCLE 419 ON READER SERVICE CARD

Econometric Software

Alpha Software introduces *ESP*, an econometric software package for the IBM PC and compatibles. *ESP* integrates econometric and statistical analysis with graphics and database management and includes on-line help, on-line tutorials, and extensive command menus.

alpha SOFTWARE CORPORATION

Alpha Software Corp., 30 B. St., Burlington, MA 01803. (617) 229-2924.

CIRCLE 420 ON READER SERVICE CARD

THOR from Fastware

Fastware has released *THOR*, an integrated database and word processor package for the IBM PC and XT. Billed as a

GenTech

THIS MONTH'S SPECIALS

NEC Spinwriter 3550 (IBM Codes)	$1695
BROTHER/DYNAX HR-25	$749
EPSON FX-100	$699
STAR MICRONICS Delta-10 (160 CPS)	$419
STAR MICRONICS Radix-10 (200 CPS)	$599
U.S. ROBOTICS Password Modem (1200 Baud)	$349
PGS Max-12 (12" Amber, For IBM)	$189
ROLAND MB-122A (12" Amber, IBM)	$175
TANDON TM 100-2 (DSDD, For IBM)	$219
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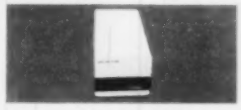

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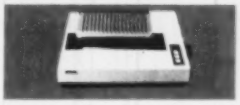

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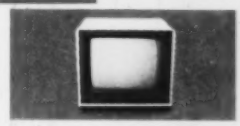

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CIRCLE 205 ON READER SERVICE CARD

Opportunities Available in Software Field Despite Increasing Cost of Entry

Ten years ago when Ed Roberts introduced the first Altair at MITS, other entrepreneurs were quick to follow with new and improved designs. Within a few years, hundreds of small companies were making computers, peripherals, and software in this fledgling industry.

However, by 1980, the cost of designing and launching a new personal computer had risen into the million dollar range and the "entrepreneur with an idea" had to find venture capital as well as management and marketing talent or run a high risk of failure.

However, as opportunities decreased in the hardware arena, they opened up in software. As more and more computers were sold to less knowledgable customers, the demand for user-friendly software increased dramatically. Thus, we saw the amazing success of packages like *VisiCalc* and *Lotus 1-2-3*.

However, paralleling what happened in hardware, the cost of entry in the software field today is soaring. The development costs for a new line of six educational packages just introduced by CBS Software reportedly were in the million dollar range. And that was exclusive of any marketing or distribution costs. At Softcon we talked to several companies introducing new business packages and found that most of them planned to invest $2 to $3 million before getting a dollar of profit. Clearly, the entrepreneur today faces a different situation than he did just a year or two ago.

Where are the opportunities for an entrepreneur today? Perhaps the greatest opportunities lie in making vertical market add-ons for popular hardware/software combinations. For example, there are more than 15 templates and add-ons for *VisiCalc* alone. These include products like *Sideways* (prints a worksheet sideways on a printer) from Funk Software, the Omega Microware templates for taxes, and audio cassette training packages from Flip Track Learning Systems. Other packages focus on the particular needs of dentists, lawyers, CPAs, and other specific end users.

So although the complexion of the market is changing, it is still exciting and still offers unparalleled opportunities (and challenges) for those who want to strike out on their own. —*DHA*

ETC.

Back to Basics

Dartmouth College Professors John G. Kemeny and Thomas E. Kurtz, the inventors of Basic back in 1964, are rewriting Basic to perfect the language and try to make some money from their original creation. They have formed True Basic Inc. to market their improved version, which runs on most popular microcomputers and eliminates the need for different textbooks for each machine.

New at Softcon *continued*

free-form "THought ORganizer," THOR allows the user to define a category, save a file under it, and then link files together by category, date, or text.

FASTWARE INC

The word processor provides basic writing and editing functions as well as selected screen formatting features such as inverse video, blinking characters, and alternate character sets. You can move text to and from other software packages, including programming languages.

Fastware Inc., 200 Freeway Dr. East, East Orange, NJ 07018. (201) 676-7963.

CIRCLE 421 ON READER SERVICE CARD

Integrated Software from Lotus

Lotus Development, the makers of *1-2-3*, have slated *Symphony*, an integrated software package for the IBM PC and XT, for release in July 1984. *Symphony* combines spreadsheet, word processing, graphics, database management, and communications programs into one package. It uses an open-ended window feature to display different applications on one screen. Owners of *1-2-3* will be able to trade in that program and receive a substantial discount on *Symphony*.

Lotus Development Corp., 55 Wheeler St., Cambridge, MA 02138 (617) 492-7171.

CIRCLE 422 ON READER SERVICE CARD

MultiMate For TI Professional

Texas Instruments has released Software System's *MultiMate* word processing software for the TI Professional computer. *MultiMate* includes special functions such as a spelling checker program with an 80,000-word dictionary, a merge function, and the ability to integrate files.

TEXAS INSTRUMENTS

Texas Instruments Corp., Data Systems Group, P.O. Box 402430, Dallas, TX 75240. (800) 527-3500.

CIRCLE 423 ON READER SERVICE CARD

SmartKey II Plus

Software Research Technologies unveiled *SmartKey II Plus*, an enhanced version of *SmartKey II*, which redefines

SOFTWARE RESEARCH TECHNOLOGIES

the keyboard of the IBM PC and compatibles. *SmartKey II Plus* lets the user assign a series of commands or characters to one key, saving time and effort on repetitive tasks.

Software Research Technologies Inc., 3757 Wilshire Blvd., Suite 211, Los Angeles, CA 90010. (213) 384-5430.

CIRCLE 424 ON READER SERVICE CARD

Printer Utility

Apex Resource has introduced *Print Command*, a printer control utility for the IBM PC and XT connected to Epson FX or IBM Graphics dot matrix printers. *Print Command* allows the user to print foreign, scientific, and mathematical characters in condensed, double-height, or

APEX RESOURCE

boldface type. Custom typefaces, fonts, and logos can also be created and printed.

Apex Resource, 23 Christine Ct., Suite 400, Stormville, NY 12582. (914) 221-2611.

CIRCLE 425 ON READER SERVICE CARD

Mindscape Educational Software

Mindscape has released its Sprout series of children's educational programs for the IBM, Apple, Commodore, and Atari. Aimed at children aged four to eight, the four programs in the series cover letter recognition, counting, addition, and size and shape relationships.

Mindscape, 1900 East Lake Ave., Glenview, IL 60025. (312) 998-5800.

CIRCLE 426 ON READER SERVICE CARD

COMING JULY 84 Apple® Graphics Utilities

☐ BEAGLE GRAPHICS™

DOUBLE HI-RES GRAPHICS by MARK SIMONSEN
$59.95: Includes Peeks & Pokes Chart
Requires Apple IIc (or IIe with EXTENDED 80-col. card).

560-WIDE WITH 16 COLORS! Beagle Graphics gives your 128K-Apple (required) a full range of colors plus *double* high resolution—560 x 192 pixels. All Applesoft hi-res functions, including shape tables, are supported.
NEW COMMANDS let you draw fast circles, ellipses and rectangles from the keyboard or from your programs.
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PROGRAM & PICTURE-CONVERTERS change your existing Applesoft programs *and pictures* to double hi-res. "Double-ize" *Apple Mechanic* shape table programs too!
DOUBLE-PLOT PROGRAM lets you draw and manipulate pictures in double hi-res. Add type to pix too. Move sections of images to either page. Save pictures to disk.
HI-RES TRICKS: Amazing stuff— any portion of a picture may be rotated, flopped, moved, inverted, superimposed, scrunched or even SAVED to disk. Saving image-portions conserves disk space.

COMING JULY 84

☐ TRIPLE-DUMP™

SINGLE/DOUBLE HI-RES "PRINT-ANYTHING" UTILITY
$39.95: Includes Peeks & Pokes Chart

PRINT ANY SCREEN IMAGE on your dot-matrix (graphics-capable) printer— Hi-Res, Lo-Res, **Double Hi-Res,** Medium-Res, as well as 40 **and 80-Column Text**. All print functions may be used in your Applesoft programs and disks. Don't settle for a "locked up" printer-dump program.
SPECIAL EFFECTS: Crop, rotate, enlarge, distort, invert... Preview pictures on the screen before you print.
BANNER MAKER: Make impressive 8"-high signs and banners for your family, home or office. Type any message—no length limit—and let your printer do the work!

☐ ALPHA PLOT™

STANDARD HI-RES GRAPHICS UTILITY
by BERT KERSEY & JACK CASSIDY
$39.50: Includes Peeks/Pokes Chart & Tip Book #4
(Alpha Plot offers 6-color 280-pixel resolution and requires only 48K; see Beagle Graphics for 128K double hi-res.)

DRAW IN HI-RES on both pages using easy keyboard commands. Pre-view lines before plotting. Use solid or mixed colors and Reverse (background opposite). One-key-stroke circles, boxes and ellipses, filled or not. All pictures are Save-able to disk for access by your Applesoft programs.
COMPRESS HI-RES DATA to 1/3 disk-space, allowing 3-times the number of hi-res pictures per disk (avg. figures).
MANIPULATE IMAGES: Superimpose pictures or *relocate* sections of images anywhere on either hi-res page.
HI-RES TYPE: Add variable-size color & b/w text to your pictures. Type *anywhere* with no htab/vtab limits. Type sideways too, for Charts & Graphs. Includes Tip Book #4.

☐ FLEX TYPE™

FLEXIBLE-TEXT UTILITY by MARK SIMONSEN
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PUT VARIABLE-WIDTH TEXT on both hi-res screens with normal Applesoft commands (including HTAB 1-70). Normal, expanded & compressed text with no extra hardware. (70-column text requires b/w monitor, not a tv).
COMBINE TEXT & GRAPHICS. Run existing Applesoft programs with Flex, GPLE/Double-Take compatible.
DOS TOOL KIT® font compatibility. Access up to 9 fonts in memory. Text editor lets you redesign text characters.

☐ FRAME-UP™

FAST APPLE DISPLAY UTILITY by TOM WEISHAAR
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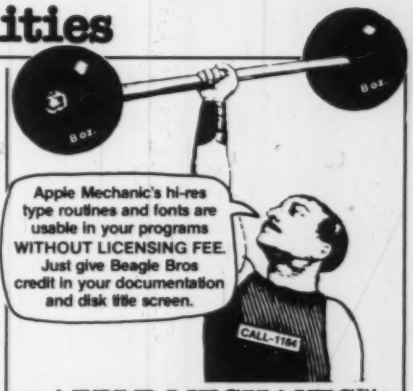
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HI-RES SHAPE EDITOR & FONTS by BERT KERSEY
$29.50: Includes Peeks/Pokes Chart & Tip Book #5

SHAPE EDITOR: Keyboard-draw hi-res shapes for animation in your Applesoft programs. Easy "List & Learn" Applesoft demos teach how to do hi-res animation as well as professional-looking hi-res Charts and Graphs.
HI-RES FONTS: Access & create proportionally-spaced hi-res type; each character totally re-definable. Six complete fonts are included on the disk (4 large & 2 small).
MORE: Useful music, text and hi-res tricks for your Applesoft programs. Clear educational documentation and step-by-step instructions for writing graphics programs.

APPLE MECHANIC HI-RES

☐ TYPEFACES™

26 FONTS FOR APPLE MECHANIC by BERT KERSEY
$20.00: Includes Peeks & Pokes Chart

26 NEW FONTS for use with Apple Mechanic programs. Many different sizes and typestyles, both ordinary and *Artistic*. Every character—from A to Z to "*" to "□"—of every typeface—from "Ace" to "Zooloo"—is re-definable to suit your needs. All type is *proportionally spaced* for a more professional appearance. People *do* notice the difference!

Disk Librarian

☐ FATCAT™ NEW!

PERSONAL DISK LIBRARY by ALAN BIRD
$34.95: Includes Peeks & Pokes Chart

MULTIPLE-DISK CATALOG: FATCAT reads all of your DOS 3.3 and ProDOS disks into one or more "Master Catalogs" that can be searched, sorted and printed. Get organized, and find out what's *really* on all of those floppies!
ALPHABETIZE FILE NAMES: FATCAT lets you sort your DOS 3.3 and ProDOS disk catalogs alphabetically, by file name, type, etc., to make files easier to find. Once arranged, a new disk directory may be written to the disk, so your files are in the order you want when you CATALOG. This feature alone is worth the price of FATCAT!

```
10 REM BEAGLE CARD FILE
20 HGR: HGR2: POKE 232, 120: POKE 233, 64: POKE
   16504, 7: SCALE=80: P=16: X=99: FOR R=0 TO 31:
   P=P*-1: POKE 230, 48+P
30 FOR Y=0 TO 1: ROT=ABS(64*Y-R): HCOLOR=3:
   FOR A=1 TO 25: DRAW 1 AT X+2*A, X: NEXT
40 HCOLOR=0: DRAW 1 AT X, X: ROT=32: DRAW 1:
   DRAW 1 AT X, X: NEXT Y, R
50 FOR A=0 TO 20: FOR B=0 TO 1: POKE 49237-B,0:
   X=PEEK(49200): FOR C=1 TO 6*A
60 NEXT C, B, A: GOTO 50
```

Beagle Bag!

☐ BEAGLE BAG™

12 APPLE GAMES ON DISK by BERT KERSEY
$29.50: Includes Peeks & Pokes Chart
Apple software customers recently voted BEAGLE BAG to Softalk's "Most Popular Software" list for 1983.

COMPARE BEAGLE BAG with any one-game locked-up disk on the market today. All 12 games are a blast, the price is right, the instructions are crystal clear, *and* the disk is COPYABLE. You can even *change* the programs or list them to learn programming tricks by seeing how they work.
TWELVE GAMES that *last*— TextTrain, Wowzo, Magic Pack, Buzzword, Slippery Digits, and many many more...
EXCELLENT REVIEWS—Read Jan-83 *Softalk*, pg.148.

Beagle Bros
Micro Software Inc.

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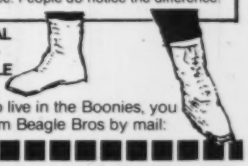
Attention Dealers: Beagle Bros products rank consistently high on software best-seller charts, and captured FOUR spots on *Softalk's* 1983 Top-30 Most-Popular List (all categories). Telephone any Apple software distributor for fast delivery.



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Or, if you happen to live in the Boonies, you can buy directly from Beagle Bros by mail:

RUSH the following disks by First Class Mail:

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☐ Apple Mechanic	29.50	☐ Flex Type	29.50
☐ A.M.Typefaces	20.00	☐ Frame-Up	29.50
☐ Beagle Bag	29.50	☐ GPLE	49.95
☐ Beagle Basic	34.95	☐ ProntoDOS	29.50
☐ Beagle Graphics†	59.95	☐ Silicon Salad	24.95
☐ DiskQuik	29.50	☐ Tip Disk #1	20.00
☐ DOS Boss	24.00	☐ Triple Dump†	39.95
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☐ Double-Take/Pro	34.95	☐	

†Available July 1, 1984

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CIRCLE 110 ON READER SERVICE CARD

"Thoughtware, How Can I Become A More Effective Leader?"

Thoughtware is new, easy-to-use software that will help you see and understand how to become a better manager. It's a unique series of personal, computer-based management diagnostic and training programs.

® Thoughtware is a registered trademark of the Institute for Management Improvement.

How can you become a more effective leader? Thoughtware Program 2.1, "Leading Effectively," will tell you. This four part program has been designed to help managers improve their effectiveness as leaders. It gives you an opportunity to assess your own management style and to compare your results to the self-assessments of other managers.

Unit 1 defines leadership and discusses its three key elements—style, situation and strategy. It stresses the importance of matching the leadership style to the situation and of getting and giving feedback.

Unit 2 is designed to improve your leadership style and increase your ability to perform more effectively. You will see the difference between the kinds of power you exert and the importance of using your influence to affect the behavior of others. You'll also learn about three factors affecting your leadership style: the assumptions you make about people, the degree to which you are task- or people-oriented, and the attitudes you have about the competence of those you supervise.

Unit 3 asks you to analyze a leadership situation you currently face in order to determine what style of leadership is appropriate for your particular situation.

Unit 4 offers guidance on how to use eight effective leadership conditions.

To take advantage of the incredible new technology that is Thoughtware, see the adjacent column.

Thoughtware Programs run on the following:
IBM® PC and compatibles with color graphics card.
Apple® II Plus and IIe.

Thoughtware®

Expanding The Universe Of Learning.

CIRCLE 184 ON READER SERVICE CARD

Thoughtware Is The Future.

It's a new way to learn, a logical and innovative approach to management training. It will revolutionize management training now, and in the future. Thoughtware utilizes the latest research in management development from leaders in the field, and has been tested nationally.

For individuals, and their organizations, the educational, economic and operational benefits of Thoughtware's computer-based learning programs are enormous. But Thoughtware isn't just the future.

Thoughtware Is The Present.

Some of the largest and most prestigious corporations and organizations in the world have purchased Thoughtware's assessing Personal Management Skills Program.

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	McGraw-Hill
Bank of Boston	MCI
Bureau of the Census	U.S. Navy
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Dos, Dos, Who's Got the Dos?

As the number of operating systems available for microcomputers increases each year, and the companies making these systems begin to market them more aggressively, a battle to become the "industry standard" heats up.

Years ago, CP/M, from Digital Research, came close to dominating the microcomputer operating system market. Then IBM introduced the PC, which ran Microsoft's PC/MS-DOS. As IBM PC and PC clone sales skyrocketed, PC/MS-DOS replaced CP/M as the most widely-used operating system.

That may not last for long, however, even if the Japanese microcomputer manufacturers follow through with their announced intention to use PC/MS-DOS. Digital Research's operating system Concurrent CP/M is gaining popularity, and rumors hint that IBM may scrap PC/MS-DOS and develop its own operating system.

Meanwhile, AT&T is marketing Unix System V, its newest version of the original Unix, with the slogan "from now on, consider it standard." Unix System V retains many features of the previous Unix operating system while adding others. It runs programs 5 to 10 percent faster than the old Unix, permits shifts between several processing tasks, introduces a new command to send trouble reports to the Unix software support center, and is generally easier to use than previous Unix versions.

AT&T is large enough to sell Unix System V successfully, but whether it can fight off other challengers and catch industry leader PC/MS-DOS remains to be seen.

The Best of Two Worlds

Whitesmiths, Ltd., a Concord, MA firm, has decided that Unix can become as successful as PC/MS-DOS. The company has released a new version of Idris, its low-cost, Unix-compatible operating system, which runs as an application under PC/MS-DOS programs without rebooting your computer.

Generation Gap

Multi Solutions of Lawrenceville, NJ, touts its new operating system, S1, as the "world's first 4th generation operating system." The company claims "Unix is a dinosaur" and "CP/M and MS-DOS are toys," and that only S1 deserves to be the "next world standard."

S1 runs on the Z80, 68000, 8080, 8085, and 8086/8088 microprocessers. The company plans to make S1 available for the 80186, 80286, and 16032 during 1984.

S1 saves memory and loading time with a module system that allows unwanted components to be omitted. It can read and write files to and from CP/M, MS-DOS, Unix, and other operating systems, and will support up to 256 processors simultaneously from any CPU. Multi Solutions claims languages and applications running on S1 can be ported to different microprocessors and be up and running at fully compiled speed within man-months instead of man-years.

Multi Solutions faces an uphill battle to overcome Unix, PC/MS-DOS, CP/M and other operating systems such as Pick, Oasis, and p-system. Perhaps prophetically, Multi Solutions notes "in time, only the best will survive." —*RSL*

AT&T, 222 Broadway, New York, NY 10038. (212) 669-2584.

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Multi Solutions Inc., 123 Franklin Corner Rd., Suite 207, Lawrenceville, NJ 08648. (609) 896-4100.

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What's New In **Hardware**

Sinclair QL Computer

Sinclair Research Limited has announced the Sinclair QL computer, designed for home, business, or educational use. The QL is supplied with its own powerful and integrated software, featuring word processing, graphics, data management, and a spreadsheet.

Measuring 5-3/8" x 1-3/4" x 18-3/8" and weighing just over 3 lbs., the QL offers via rear peripheral ports full networking, dual joystick, and ROM cartridge expansion capabilities. Industry standard RS-232C communications facilities for other computers, printers, and modems are available, and RGB and TV ports are provided for use with either color or monochrome monitors and TVs.

The QL includes 128K RAM (expandable via a 0.5Mb RAM pack to 640K); two built-in 100K QL microdrives for mass storage, and a full-size 65-key QWERTY keyboard.

Based on four Sinclair-designed semi-custom ICs, the QL incorporates a powerful 32K ROM that contains the QDOS operating system and the Sinclair SuperBasic language. The advanced Motorola 68008 32-bit processor with its 1Mb (empty) linear address capability means nearly unlimited expansion potential for other peripherals.

Future peripherals under development include:

- 0.5Mb expansion board
- Pascal compiler
- 68000 assembler
- terminal emulator
- analog/digital interface
- hard disk interface
- modem
- parallel-printer interface with multi-channel sound generator
- IEEE-488 interface.

The applications programs included are:

- QL Quill—word processor
- QL Abacus—spreadsheet
- QL Archive—database
- QL Easel—graphics

All have a pyramidal structure that takes you directly to the most used facilities, enabling even inexperienced people to perform tasks immediately. Output is displayed in the format in which it will be printed or plotted. The software is self-documented, featuring comprehensive information on the current status, extensive help, and continuous prompting.

The Sinclair QL will be available in the U.S. in late 1984 at a suggested retail price of $499.

For further information, contact Sinclair Research Limited USA, 50 Staniford St., Boston, MA 02114. (617) 742-4826.

CIRCLE 432 ON READER SERVICE CARD

IBM Announces Portable Computer

IBM's new Portable PC, weighing 30 lbs. and measuring 20" x 17" x 8" is a self-contained unit that can be taken where it is needed.

Priced at $2795 at IBM Product Centers, the IBM Portable PC features:

- 256K RAM expandable to 512K
- built-in, 9" amber monitor with an 80 x 25 display
- a universal power supply for use in different countries
- 360K slimline disk drive
- color/graphics adapter
- Five expansion slots
- carrying bag for the system unit
- 12 month limited warranty

An optional second slimline drive can be added to the system unit, doubling disk storage to 720K.

The IBM Portable PC uses the same high-performance, high-speed, 16-bit 8088 microprocessor used in the IBM PC, PC/XT, and PCjr. With IBM DOS 2.1, the portable can use most of the software already available for IBM Personal Computers.

CIRCLE 433 ON READER SERVICE CARD

New Products to Establish PC Clusters

The IBM PC Cluster Program supports the connection of IBM Personal Computers—PCs, XTs, Portable PCs, and entry model PCjrs. Up to 64 computers can be connected in a cluster.

Using the system, messages and information can be exchanged and shared between workstations connected by cable. Workstations can also share information and storage space on a fixed disk at one machine in the cluster.

To support the interconnection of different IBM Personal Computers, IBM also announced a series of options which customers can install:

- The IBM PC Cluster Adapter, required for each PC, PC/XT, or Portable PC in the cluster. The adapter fits in one of the full-size expansion slots on the system unit.
- The IBM PCjr Cluster Attachment, required for each PCjr in a cluster. It attaches to the side of an entry model PCjr system unit. In the future, IBM intends to provide the ability to attach all current PCjr models to the cluster.

For further information, contact IBM, Entry Systems Division, P.O. Box 2989, Delray Beach, FL 33444. (305) 241-7614.

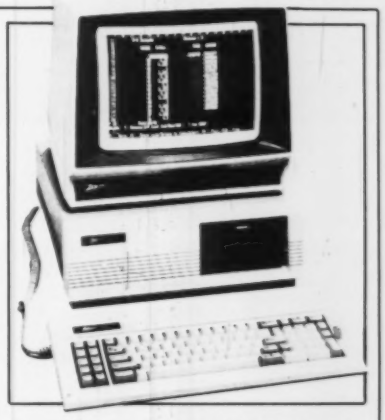
CIRCLE 434 ON READER SERVICE CARD

Zenith Introduces Series of Five IBM-Compatible Personal Computers

Zenith has introduced a series of five IBM-compatible personal computers.

"The new Zenith Z-100 PCs are IBM-compatibles that go beyond compatibility by offering more standard features, improved design, and better performance—all in a smaller package and at competitive prices," said Donald P. Moffet, Zenith Data Systems president.

The new line of Z-100 PCs includes three desktop systems and two portable systems. All have 128K RAM expandable to 640K, two RS-232C serial ports, one Centronics-compatible parallel port, RGB color output, an IBM expansion bus and a detached keyboard. When fully configured, all have four additional slots for expansion. Desktop models also provide a "gray-scale" monochrome output.



Desktop systems are available in three configurations with 5-1/4" floppy drives: single drive system ($2699), dual drive system ($3099), and a dual drive system with one floppy drive and one 10.6 MB Winchester hard disk ($4799). Monitors are separate.

The two portable systems, both with built-in 9" amber monitors, are priced at $2799 for the single disk version and $3199 for the dual disk version.

For information, contact Zenith Data Systems, 1000 Milwaukee Ave., Glenview, IL 60025. (312) 391-8744.

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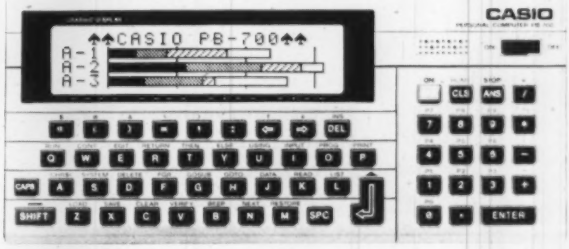
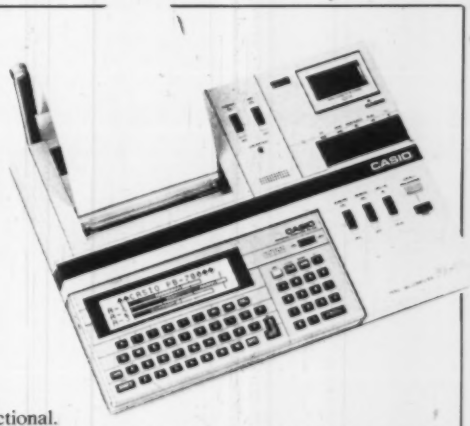
Casio Introduces New Handheld Personal Computer





Casio, Inc. has introduced the PB-700, a new handheld personal computer. The PB-700 has a large 4K memory that can be expanded in 4K increments to 16K, all within the main unit.

The advanced multi-line LCD is large enough for four lines of 20 characters in both upper- and lowercase letters. The LCD is dot addressable (160 x 32 dots) for the display of graphs and charts.

The PB-700 has 58 keys, which make the keyboard and keypad fully functional. One-key Basic commands on the keyboard reduce the time and effort required to write a program.

Other features include:

- beep tones that make you aware of inputs or outputs from the computer
- automatic turn off after several minutes without use

The computer can be expanded into a system with the FA-10 plotter/cassette interface. This full 4-1/2" wide four-color plotter can print up to 80 characters across. A standard cassette recorder can be used with the FA-10 to store or load programs or data. The FA-10 retails for $249.95.

The PB-700 retails for $199.95.

For further information, contact Casio, Inc., 15 Gardner Rd., Fairfield, NJ 07006. (201) 575-7400.

CIRCLE 436 ON READER SERVICE CARD

Structured Programming In Basic

Part 2: Control Blocks

Arthur Luehrmann

Hitting the Programmer's "Wall"

Would-be marathon runners all learn that the human body does not take kindly to a continuous 26-mile run. They describe their first failed attempts as "hitting the wall." No matter how they pace themselves, something in their bodies just poops out after a certain amount of time and effort. For weeks or months on end, they can run just so far and no farther.

Programmers know this feeling. They have no trouble with a 50-line program. A 100-line program seems more than twice as hard to get right, but they can manage it. Doubling the length again far more than doubles the effort, but most programmers can hack their way through a 200-line program and get it to work. However, brute force programming finally poops out for most people at 400 or 800 lines. This is where most programmer's "hit the wall." Try as they will, they simply cannot get a really long program to work—ever. There is always that mysterious "last bug" that needs to be gotten rid of.

Marathoners finally manage to get past the runner's wall. Programmers, too, can get past the programming wall. It takes training and discipline, but both runners and programmers can ultimately succeed. The purpose of this four-part series is to present a reliable method of writing programs of *any* degree of complexity and getting them to work successfully—a method that will keep people from hitting the programming wall.

The method, known as *structured programming*, was introduced nearly 15 years ago and is the standard practice among professional programmers today. Unfortunately, few Basic programmers have had an opportunity to learn it; people who teach Basic and write Basic manuals rarely mention the method. That, no doubt, is why academic computer scientists tend to agree with Professor Dijkstra's famous assessment of today's Basic programmers: "They are mentally mutilated beyond the hope of regeneration."

It need not be thus. In the full, unabashed hope of "regenerating" the millions of Basic programmers in the world today, last month's article presented one of the two major ideas encompassed by the term *structured programming*. That idea is called *top-down design*. Briefly, it means solving a problem first at a very abstract level, without getting bogged down in details, and later supplying the details. The resulting program has a definite form: a main routine that gives the big picture and a hierarchy of subroutines containing more and more detail.

This month's article is about the other main idea of structured programming: handling all problems of program logic by disciplined use of a small number of *control blocks*.

What Makes Program Logic Hard?

What makes a computer program hard to read and understand? Each individual statement is easy enough. The grammar rules in all programming languages are so simple and uniform that one can learn the main statements in an hour or two. When you focus on a single PRINT, LET, GOTO, or IF statement, for example, there is no doubt what it means. Yet the whole collection of statements is vastly more complex than you would expect from combining these few simple statements. Why is that?

Here is a small example. Although this fragment of a longer program has only ten lines, it will take you a while to understand what it is supposed to do. You will need even longer to be sure that the program actually works correctly in all cases. Puzzle it out before going on.

```
10 PRINT "DO YOU WANT INSTRUCTIONS?"
15 INPUT A$
20 IF A$ = "YES" THEN 50
22 IF A$ = "NO" THEN 25
23 PRINT "PLEASE TYPE YES OR NO"
24 GOTO 15
25 PRINT "OKAY. LET'S GET STARTED."
30 GOTO 90
50 PRINT "HERE ARE THE INSTRUCTIONS"
52 PRINT "...
:
:
90
```

Although this is a short fragment, you probably had to read it a few times to understand its purpose: to ask the user whether or not to print instructions for using the program, and then either to print them or to skip them. You had to read lines 15-24 more carefully to see the idea there: to prompt the user for new input if the answer to the question was neither yes nor no. To be con-

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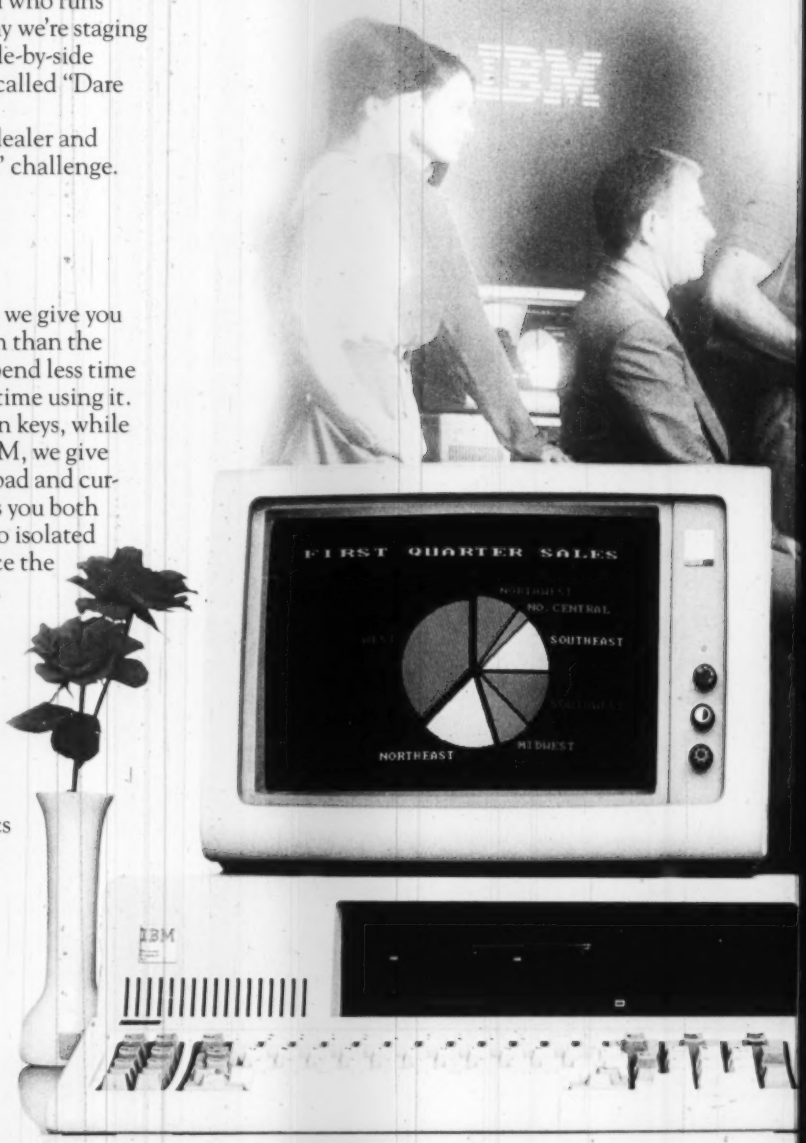

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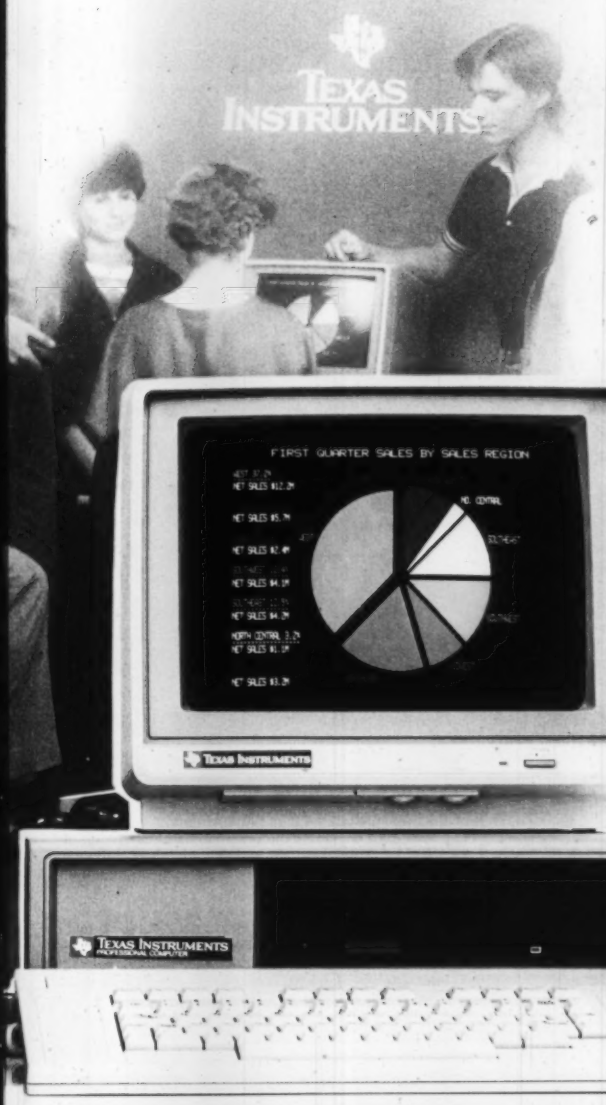

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fident the ten lines worked, no matter what the input, you had to go follow the logic for yes, for no, and for anything else.

How can this much complexity be contained in just ten Basic lines? The answer becomes clearer when we draw *jump arrows* on the listing. These arrows show all the line-number jumps caused by IF and GOTO statements.

```
10 PRINT "DO YOU WANT INSTRUCTIONS?"
15 INPUT A$
20 IF A$ = "YES" THEN 50
22 IF A$ = "NO" THEN 25
23 PRINT "PLEASE TYPE YES OR NO"
24 GOTO 15
25 PRINT "OKAY. LET'S GET STARTED."
30 GOTO 90
50 PRINT "HERE ARE THE INSTRUCTIONS"
52 PRINT " . . .
 .
 .
 .
90
```

It is all these criss-crossing jump arrows that make for complexity. In these ten lines, there is a total of eight entry and exit points for the jumps. To understand the program and be certain that it is correct, you must follow all the crossed arrows and make sure that you have explored every possible combination of paths.

If ten statements can cause this much complexity, think what can happen in 100 lines or 1000 lines. The crossed jump arrows would look as orderly as a plate of spaghetti. The number of combinations of paths grows astronomically as program length increases. One might never be able to be certain that a long program is truly correct or to figure out how to fix logical errors. Surely, there must be a better way to make program logic clear.

The Law of Straight Sequence

There is one obvious way to avoid these spaghetti programs: never use statements that cause jumps of control to other statements. If we never used IF or GOTO statements, our programs would contain no jump arrows at all. There would be only one path through the program: a straight sequence of steps from top to bottom. Human psychology is such that people find it comparatively easy to understand programs that obey this Law of Straight Sequence.

Unfortunately, such a program would also be fairly useless. What kind of program could we write if all we had available were the basic *action* statements: INPUT, LET, PRINT, and the like? Without any *control* statements, such as IF and GOTO, we would have no way to tell the computer to perform *either* one action *or* a different action. Likewise, we would have no way to tell the computer to go back and *repeat* some action again and again. Our programs could consist of nothing but a list of actions to be carried out one after the other in strict sequence.

"Sorry I'm late."

We have a dilemma. The simplest kind of program to understand is a straight sequence of actions, with no jumps of control

What kind of program could we write if all we had available were the basic action statements: INPUT, LET, PRINT, and the like?

at all. On the other hand, such programs seem unable to create the loops and the branches upon which all useful programs depend. It looks as though our programs are destined to be complex if they are to be useful. Indeed, for the first 20 years of programming computers, this was the commonly held belief: The longer the program, the more spaghetti code one had to live with. The only remedy seemed to be lots and lots of documentation, including copious in-line remarks and detailed flowcharts that showed all the jumps graphically.

One-In/One-Out Blocks

Things began to change around 1965. Computer memories were getting bigger, allowing programmers to write longer and longer programs. Suddenly, the cost of creating and maintaining large programs was beginning to approach the cost of the hardware needed for a computer application. Between 1965 and 1970, many computer scientists turned their attention to the problem of simplifying programs. The results of their work are embodied in all computer languages created since then, including Pascal, PL/I, C, Ada, and Modula-2. Recent versions of Fortran and Cobol, as well as the proposed new ANSI Basic standard, also reflect these ideas.

Let's look at the problem they faced, but from the perspective of the Basic language as it exists on most computers today. Here is the fundamental dilemma: In trying to avoid program complexity, we have stated a *goal*, discovered a sad *fact*, and are now left with a new *problem*:

Goal: To make *every* program obey the Law of Straight Sequence.

Fact: You cannot create a *loop* or a *branch* in Basic without using *control* statements, which break the sequence.

Problem: How do you make Basic *loops* and *branches* look like plain, simple *action* statements?

This problem has a simple solution—in Basic or any other language. In fact, the statement of the problem contains a hint at the solution: Instead of thinking about a program as a list of individual statements, we should be thinking about larger units, which we'll call *blocks*. Then we'll apply the Law of Straight Sequence not to the individual statements but to the larger blocks.

Let's see what that means. For single action statements, such as LET, INPUT, and PRINT, the computer *always* performs the statement and then *always* goes on to the next statement. That is what makes a straight sequence of action statements simple. We want this same simplicity to apply to our new blocks. In other words, we want the computer *always* to perform a whole block and then *always* to go on to the next block in the program.

That puts limits on what we can call a block. For example, no block may have a GOTO or IF statement inside the block that

causes a jump to a statement outside the block; if we did, the computer would *not* always go on to the next block in the program listing. A jump out of a block would violate the Law of Straight Sequence of blocks.

Blocks with no jumps to other blocks are sometimes called *one-in/one-out* blocks. There is only one proper way for the computer to get into such a block: at the top. There is only one way to get out of the block: at the bottom. If the computer ever enters a one-in/one-out block, it must finally exit that block at the bottom and go on to the next block. (That is exactly the sense in which a one-in/one-out block is like a simple action statement, such as PRINT. If the computer ever starts performing a PRINT statement, it must finally exit the PRINT statement and then go to the next statement.)

The Action Block

The simplest one-in/one-out block is the *action block.* In fact, it is so simple that it is easy to overlook. The action block is just a straight sequence of action statements. For example, any sequence of INPUT, LET, and PRINT statements is an action block.

How do we know that an action block is a one-in/one-out block? That's easy: it is forbidden to contain a GOTO, IF, or other control statement, so there can be no forbidden jump to another block. The computer simply performs one action statement after another in the block and finally exits the block at the bottom.

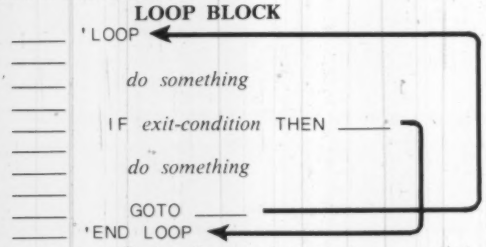
The simplest action block is the *empty block:* a block that contains no statements at all. This may seem like a silly idea, but it is as useful when talking about blocks as zero is when talking about numbers. The next-simplest action block is one that contains a single action statement. Two action blocks in a row are the same as one larger action block that contains all the original statements.

The Loop Block

Now let's get back to the main problem: taming those wild loops and branches. Recall that it was the IF and GOTO statements that were necessary to create loops and branches in program logic. Yet they also added immense complexity. Is it possible to turn loops and branches into one-in/one-out blocks?

Your first guess might be no, since the GOTO and IF statements are essential in Basic loops and branches. However, it is perfectly legal to have GOTO and IF statements in a one-in/one-out block *as long as they do not cause a jump outside the block.* Internal jumps are OK.

How then can we define a *loop block* in such a way that it is also a one-in/one-out block? The answer is very simple, as shown in this outline:



As many new Basics allow, we have used an apostrophe (') to stand for REM. In other Basics, one would write REM LOOP and REM END LOOP at the beginning and end of the block. The indented phrases, "do something" stand for blocks of statements that are to be performed again and again during the loop. The phrase "exit-condition" stands for an expression such as X > 10, or A$ = "QUIT". It tells when to stop looping. The jump arrow after THEN means that the line number after THEN must be the same as the line number of the 'END LOOP statement. The jump arrow after GOTO has a similar meaning.

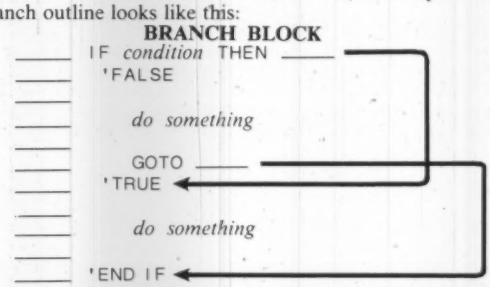
Is the loop block a one-in/one-out block? Yes, with one proviso: the "do somethings" must also be one-in/one-out blocks. That way, there can be no jumps outside the loop block. The single entry point at the top is labelled LOOP. The single exit point at the bottom is labelled END LOOP. Notice also that the target of each jump arrow is a remark statement. The phrase after the apostrophe explains the *reason* for the jump: to cause looping or to end it.

If the computer ever enters a one-in/one-out block, it must finally exit that block at the bottom and go on to the next block.

Notice that the GOTO and IF statements are *necessary* to make the loop block work. The GOTO causes the looping, and the IF causes the exit. Without these statements, there would be no loop block. But also notice that there are no *wild* GOTOs or IFs that jump to other blocks. One should think about the GOTO and IF statements *not* as ends in themselves but as *means* of building blocks such as loops and branches.

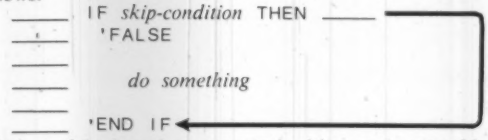
The Branch Block

What about program branches? Can they also be written in the form of a one-in/one-out block? Yes, in every case. The branch outline looks like this:



As in the loop block, "do something" stands for any one-in/one-out block. If the "condition" in the branch is true, the computer performs the TRUE "do something"; if false, the computer performs the FALSE "do something." Note also that a remark statement is the target of each jump, and the remark explains the reason for the jump. Since there are no jumps out of the block, it is indeed a one-in/one-out block. The entry point at the top is the IF statement. The exit point at the bottom is the 'END IF statement.

If one of the "do somethings" is an empty block (that is, a block with no statements), the outline can be abbreviated as follows:



This is useful when the computer is either to do something or to do nothing special. If the "skip-condition" is true, control jumps to the end of the block.

Other Blocks?

So far, we have seen three kinds of one-in/one-out blocks: *actions, loops,* and *branches.* Are there others that will be needed

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to solve some program problem or other? Or is there a limit to the number we will need to know about? The remarkable answer to these questions is that this set of only three blocks is sufficient. In 1966 Boehm and Jacopini proved the following completeness theorem:

Theorem: Any program logic, no matter how complex, can be resolved into action blocks, loop blocks and branch blocks.

If these claims seem too good to be true, bear in mind that one block may be *nested* inside another. The "do something" part of a loop or branch may be another loop or branch as easily as an action block. For example, you can create a three-way branch by nesting one two-way branch inside another one. The main point, however, is that at any level of detail of a well structured program, the only thing one finds are actions, loops, and branches.

That means that at the one level, the program itself is nothing but a straight sequence of these blocks. By using only these three types of one-in/one-out blocks, the problem posed earlier is solved. Instead of a straight sequence of *statements,* however, a well structured program is a straight sequence of action, loop, and branch *blocks.*

Using One-in/One-out Blocks

Now let's see how to put into practice the power of the Boehm and Jacopini theorem. Let's attack the problem that led to so much spaghetti code at the beginning of this article.

Recall that the program began by 1) asking the user whether or not to print instructions. Then 2) it accepted input until the answer was yes or no. Finally 3), it printed either the instructions or the message, "OKAY. LET'S GET STARTED."

What kinds of structures correspond to these three steps of the program? Step 1 is the simple *action* of printing a question on the user's screen. Step 2 is a *loop,* since the input request may be made several times if the reply is not yes or no. And step 3 is an either/or situation: a *branch.* The following English language outline says what these parts of the program must do:

1. *Action:* Ask if instructions are needed.
2. *Loop:* Get input until the answer is yes or no.
3. *Branch:* If the answer is yes, give instructions; otherwise say, "OKAY. LET'S GET STARTED."

Notice already how much clearer this analysis of the problem is than the spaghetti code version with which we began. The process is divided into a *straight sequence* of three steps. The computer is to perform the first step and then go on to the second. Then it is to do the second step and go on to the third, etc.

The next phase in solving this problem is simply the translation of each step, one at a time, from English into the appropriate structures available in the programming language. In Basic, the outlines shown earlier for actions, loops, and branches are the ones to use.

Step 1 is a simple action and can be handled by a single PRINT statement:

```
10 PRINT "DO YOU WANT INSTRUCTIONS?"
```

That was easy. Step 2 is a loop, so we begin by simply copying down the loop outline, filling in blanks with appropriate line numbers:

```
15 'LOOP
20      do something
25    IF exit-condition THEN 40
30      do something
35      GOTO 15
40 'END LOOP
```

All that remains is to fill in the two "do somethings" and the "exit-condition." The job of the loop is to get user input and, if necessary, to prompt for new input. The first "do something" must be an INPUT statement. The "exit-condition" for leaving the loop must be that the user's reply is yes or no. Any other reply means that the second "do something" is performed; it must be a PRINT statement containing the prompt message. The finished block is this:

```
15 'LOOP
20      INPUT A$
25    IF A$ = "YES" OR A$ = "NO" THEN 40
30      PRINT "PLEASE TYPE YES OR NO"
35      GOTO 15
40 'END LOOP
```

Last comes the branch block for step 3. Here is the general outline with line numbers filled in:

```
50 IF condition THEN 70
55   'FALSE
60     do something
65     GOTO 80
70   'TRUE
75     do something
80 'END IF
```

When the computer reaches line 50, A$ is either YES or NO. Therefore, the "condition" can be either A$ = "YES" or A$ = "NO"; it makes no difference which. Let's choose the former. Then the second "do something" must print the instructions and the first one must say OKAY. LET'S GET STARTED. Here is the complete branch:

```
50 IF A$ = "YES" THEN 70
55   'FALSE
60     PRINT "OKAY. LET'S GET STARTED."
65     GOTO 80
70   'TRUE
75     GOSUB 1000: 'INSTRUCTIONS
80 'END IF
```

At any level of detail of a well structured program, the only thing one finds are actions, loops, and branches.

Notice above that the task of actually printing the instructions is defined elsewhere, in a subroutine, even though it is presumably called only once, in line 75. This is done in the spirit of top-down programming, which was the topic of last month's article. Giving instructions will require many PRINT statements. It is better to bury those details in a subroutine than to clutter up the branch block with them.

The whole program for these three steps now looks like this:

```
10 PRINT "DO YOU WANT INSTRUCTIONS?"
12 '
15 'LOOP
20      INPUT A$
25    IF A$ = "YES" OR A$ = "NO" THEN 40
30      PRINT "PLEASE TYPE YES OR NO"
35      GOTO 15
40 'END LOOP
45 '
50 IF A$ = "YES" THEN 70
55   'FALSE
60     PRINT "OKAY. LET'S GET STARTED."
65     GOTO 80
70   'TRUE
75     GOSUB 1000: 'INSTRUCTIONS
80 'END IF
```

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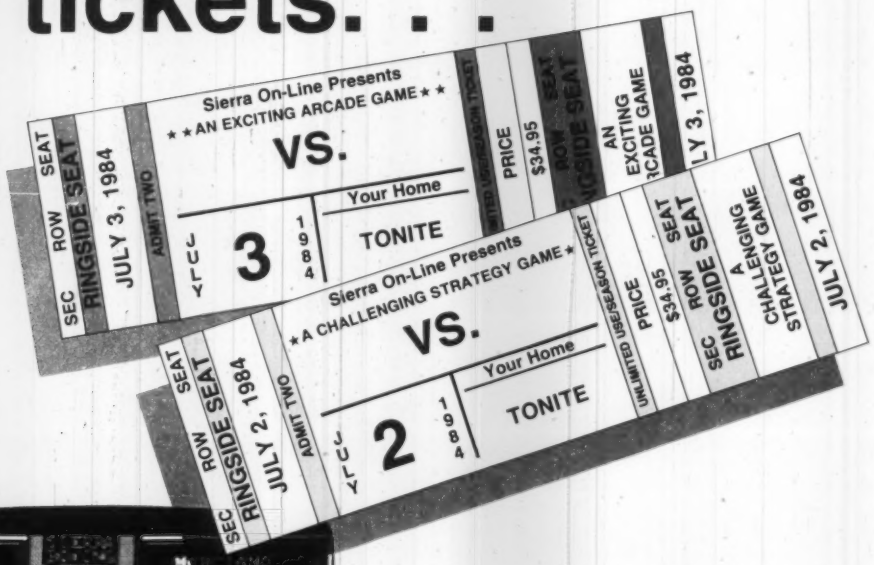

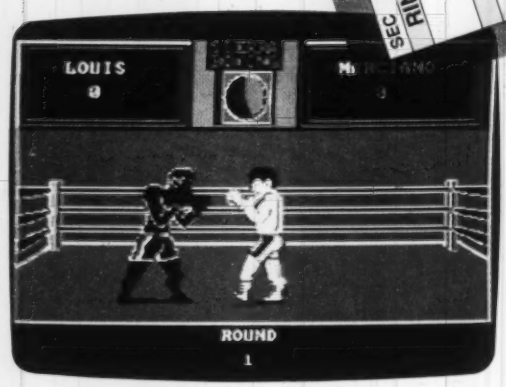

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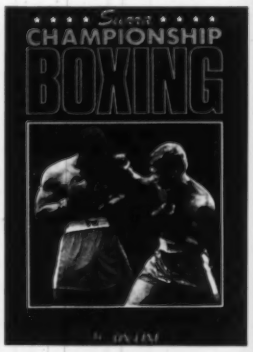

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CIRCLE 169 ON READER SERVICE CARD

We have used blank lines to separate the three blocks and improve readability. Most Basics unfortunately do not allow truly blank lines, but one can usually use an apostrophe or a colon for the same effect. We have also used indentation to show clearly the nesting of one block inside another. Some older Basics do not allow spaces for indentation, but one can use colons for the same purpose.

What About FOR/NEXT Loops?

Somehow, we seem to have skipped over the loop structure that all Basic programmers know and love: the FOR/NEXT loop. The Boehm and Jacopini theorem seems to prove that no one really needs it. In fact, that is true. The loop block presented earlier takes care of *all* looping problems.

Consider the following problem: "Write a program to print the odd numbers from 1 to 99." Here is how to use the Basic loop block for that problem:

```
10 LET C = 1
20 'LOOP
30    IF C > 99 THEN 70
40       PRINT C
50       LET C = C + 2
60       GOTO 20
70 'END LOOP
```

The first "do something" is missing: It is the empty block. The exit condition is C > 99. The second "do something" is the action block in lines 40 and 50.

Only after a person has seen exactly how this "counting loop" works—that is, how the variable is initialized, where the exit test is made, and how the variable is incremented—is it time to learn shortcuts. And that is all that the FOR and NEXT statements are: shortcuts for writing a very special kind of loop. In this counting loop, lines 10-30 and 50-70 can be abbreviated as follows:

```
20 FOR C = 1 TO 99 STEP 2
40       PRINT C
70 NEXT C
```

But the main point is that this is nothing more than an *abbreviation* for the longer form of the loop block. It is not a different type of loop. Note especially that this short form can be used *only* when the exit condition depends on the value of a counter variable which is increased by the same amount each pass through the loop. Change that special situation only slightly and the FOR/NEXT shortcut cannot be used. For example, you *can* use the FOR/NEXT abbreviation for the problem of printing the squares of the integers from 1 to 100. But you *cannot* (without using a wild GOTO) use the FOR/NEXT shortcut for a very similar problem: printing all integer squares that are less than 500.

Summing Up

This month's article on structured programming in Basic has focused on the problem of making the logic of a program easier to follow. The simplest logic obeys the Law of Straight Sequence, in which each step is carried out, and control always passes to the next step in the list of instructions. Instructions which cause control to jump wildly to other instructions are the hardest to follow.

Using only one-in/one-out blocks in programs tames these wild jumps. Only three kinds of blocks are needed: action blocks, loop blocks, and branch blocks. Programs written this way obey the Law of Straight Sequence with respect to blocks: The computer always goes from one block to the next block in the program listing, never skipping wildly forward or backward.

Such programs are easier to create and easier to maintain than the ones produced by a "free-style" programmer. They are easier to create because thinking about block structures forces the writer to adopt a standardized approach to handling all loops and branches in a program. They are easier to maintain because the logic is obvious to the eye.

Programmers who adopt the top-down planning method and the disciplined use of these control structures gain another benefit: Since the logic of their programs is clear, they need far fewer in-line remarks for documentation, and they usually abandon completely the crutch of flowcharting. Here are the main steps they follow:

Instructions which cause control to jump wildly to other instructions are the hardest to follow.

The Steps of Using Control Blocks

1. When writing a program module, avoid thinking about what kind of statement to write next.
2. Instead, decide what kind of control block will be needed: an action block, a loop block, or a branch block.
3. Using a mixture of Basic and English, write the outline of the appropriate block.
4. Fill in the body of the outline by converting English to Basic. If the body of the outline calls for nesting another control block inside the present one, repeat these same four steps with the inner block.
5. When the plan is complete, enter and debug the program module.

At first, this approach may seem less efficient than just writing statements and then patching things up during the debugging phase. In fact, the method described here will save you hours of debugging time, since you will detect most of your logical errors at the stage when you are trying to decide which control block to use. Furthermore, as your programs get longer, you won't hit the programmer's wall. Longer programs won't become astronomically harder. Try it! You have nothing to lose but your flowcharts.

Coming Next Month

Last month's article on the "top-down method" of planning a program showed how to organize your ideas without getting bogged down in details. This month's article has shown how to handle all details of program logic by using only three kinds of control blocks: actions, loops, and branches. The payoff from using both these structured programming methods comes when they are applied to solving an actual problem. Next month's article will show the whole problem-solving process of planning, implementing, and refining a program by using these structured methods.

The ideas and programming methods described in this series of articles are adapted from recent books by Arthur Luehrmann and Herbert Peckham, published by McGraw-Hill Book Company. Computer Literacy—A Hands-On Approach, *available in separate versions for the Apple II/IIe and TRS-80 Model III/4 computers, is a school textbook for use in grades 6-12. A bookstore edition entitled* Computer Literacy Survival Kit *comes complete with a program disk. The authors have also used these methods in* Hands-On BASIC for the IBM PCjr, *the Basic tutorial packaged with the PCjr.*

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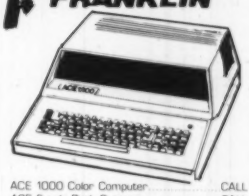

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CIRCLE 119 ON READER SERVICE CARD

Going Around On Circles: Mathematics and Computer Art

Part 2

Sheldon P. and Florence S. Gordon

Last month we pointed out the strange fascination that mathematicians have for weird situations and how computer graphics provides a spur to these interests. As an illustration of this, we examined a class of curves known in mathematics as hypocycloids, the path traced by a point on a circle rolling around inside a larger circle (Figure 1). This resulted in some fascinating patterns of both a geometrical and a numerical nature.

Having achieved such nice results, however, no self-respecting mathematician would let the idea die without pursuing it further. All kinds of other questions and speculations come to mind and, again with the power of sophisticated computer graphics, we have a tool to look at some of these other possibilities.

The most likely follow-up question that arises is probably the following: if a hypocycloid is the type of curve that is formed when a circle rolls around inside a larger circle, what happens when the small circle rolls around the *outside* of the larger one? (See Figure 2). The result is known as an epicycloid, and we shall explore some of its properties in this article.

The easiest way to picture an epicycloid is to think of a piece of radioactive bubble gum attached to a wheel which is rolling around the outside of a larger wheel. The path of the gum, as recorded by the radioactive track it leaves behind, is the epicycloid curve. Clearly, the shape of the path depends on the relative sizes of the two wheels as measured by their radii.

Therefore, let's begin by looking at the shape for different values for the radii. Suppose the rolling circle has radius 1 and the fixed inner circle has radius 2. The resulting shape is shown in Figure

Figure 1.

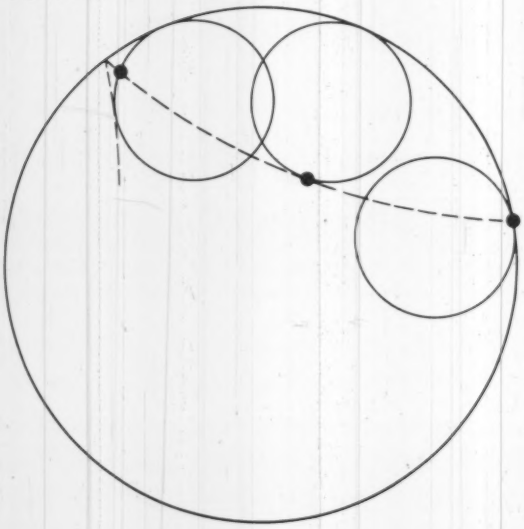
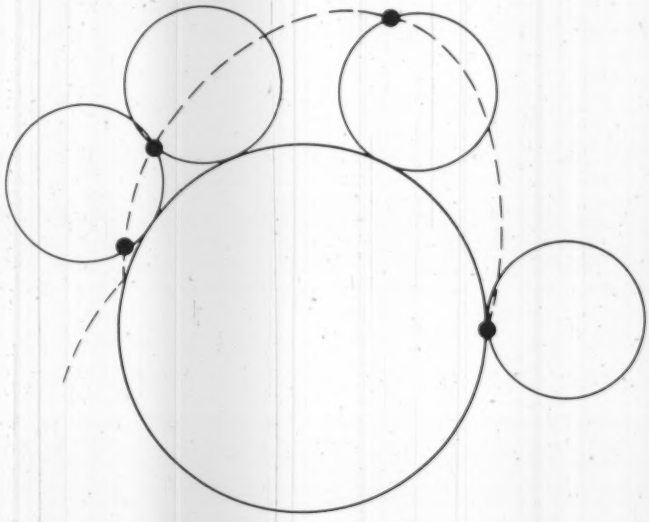


Figure 2.



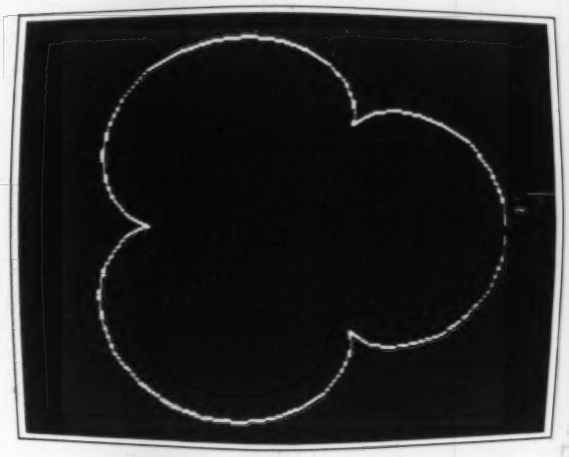


Figure 3.

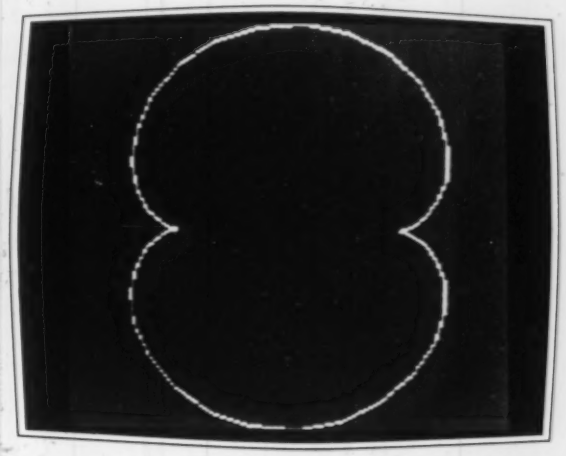


Figure 4.

3. On the other hand, if we change things slightly so that the fixed circle has radius 3, then we obtain the shape in Figure 4. Similarly, if the radius of the fixed circle is 4, then we obtain the shape in Figure 5.

Cusps and Revolutions

If we compare these three shapes in conjunction with the values for the radii, then some patterns will become evident. To make things easier, let's write the pair of radii as: (A,B) = (inner, outer). Thus, we have drawn the pairs: (2,1), (3,1) and (4,1). Notice that each epicycloid shape has the same number of arches as the radius of the inner circle. Similarly, it has the same number of sharp points (called cusps) where the point on the rolling circle touches the inner circle. With this in mind, we would expect that the shape with radii (25,1) would have 25 arches and 25 points. This is indeed the case, as is seen in Figure 6.

The easiest way to picture an epicycloid is to think of a piece of radioactive bubble gum attached to a wheel which is rolling around the outside of a larger wheel.

However, what happens if the outer circle does not have radius 1? Say it has radius 2 while the inner circle has radius 5 (5,2). The result is shown in Figure 7. From this, we see that there are still five arches and five cusps (as expected), but they occur in a more complicated pattern. If you trace out the curve with a pencil starting at the right-most cusp, you will find that the five arches are formed while making two full revolutions around the curve. Equivalently, the bubble gum comes back to its starting point, having rolled around the inner circle precisely twice while forming the five arches. The two revolutions, then, probably suggest some connection with the smaller radius 2 of the rolling circle.

With this conjecture in mind, we might expect that the pair of radii (8,3) would produce an epicycloid having eight arches and cusps, but taking three full revolutions to complete the full curve. This is shown in Figure 8. In a similar way, the pair (40,11) takes 11 full

Figure 5.

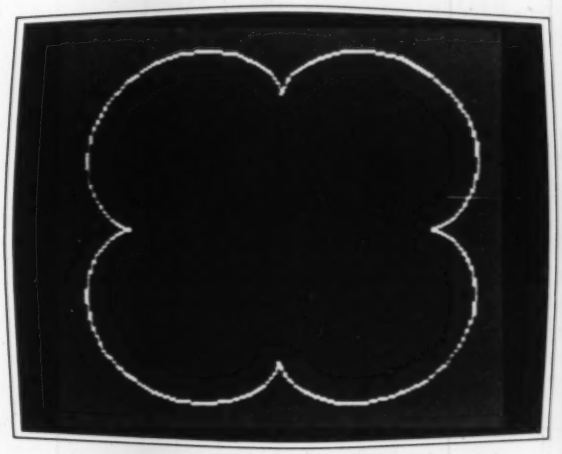
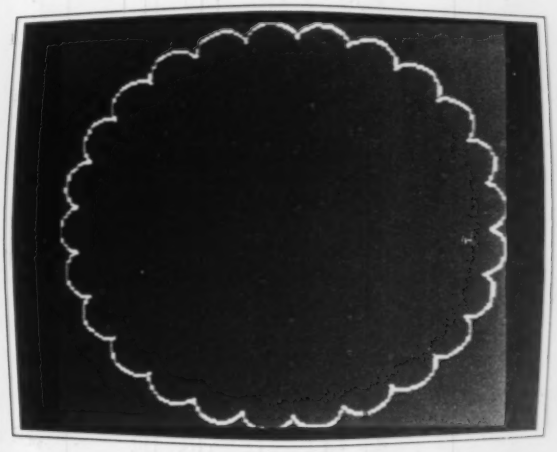


Figure 6.



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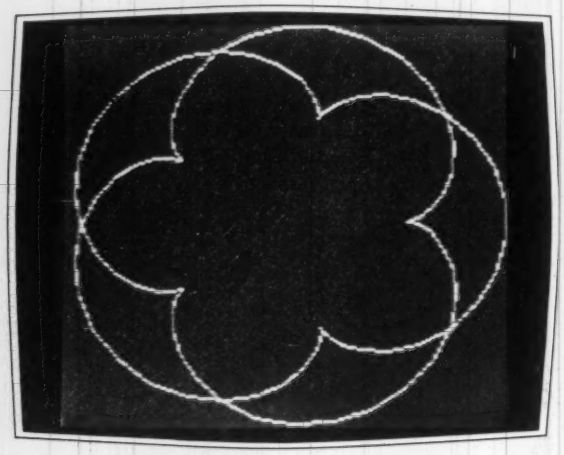


Figure 7.

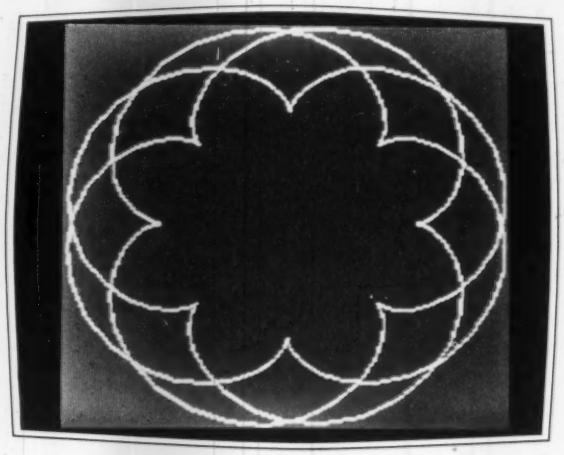


Figure 8.

revolutions to complete its 40 arches, as seen in Figure 9.

However, if you look at Figure 10, which shows the result for the pair (40,12), the apparent pattern breaks down. Here, there are only 10 arches and it took only three full revolutions to complete the curve. What happened? A mathematical bent of mind provides the answer.

Let's consider the two numbers 40 and 12. It turns out that both are divisible by 4 and, if this common factor is removed from each of them, we are left with the numbers 10 and 3. In other words, the epicycloid shape appears to depend on the factored values for the radii.

Therefore, the pair (20,6) will lead to the same shape, as will (100,30). (We should point out that it is the *shape* that is the same; the *size* of these epicycloids will be vastly different because of the different radii. The automatic scaling done by the computer allows us to ignore size while concentrating on the more interesting question of shape). On the other hand, a very slight change in the radii, say to (101,30), will result in a dramatically different shape, as shown in Figure 11.

Shapes

By this stage, there really is no point in continuing to count the number of cusps or revolutions. Instead, it is far more appealing to look on the shapes that are produced as examples of computer generated art. To share the fun of constructing these geometric patterns, we have attached a simple program that will graph any epicycloid with integer values for the radii. It is written for the TRS-80 Color Computer with Extended Basic, but can be modified easily to function on most other microcomputer models. Incidentally, the program will also operate with non-integer values for the radii, but will usually not trace out the complete curves without introducing several modifications.

For those who are mathematically inclined, the equations for the epicycloid are given by the pair of parametric equations:

$$X = (A+B)\cos(T) - B\cos\left(\frac{A+B}{B}T\right)$$

$$Y = (A+B)\sin(T) - B\sin\left(\frac{A+B}{B}T\right)$$

where B is the radius of the outer rolling circle and A is the radius of the fixed larger circle. For any values of A and B (subject to the property of dividing out common factors), the program will produce different shapes.

Figure 9.

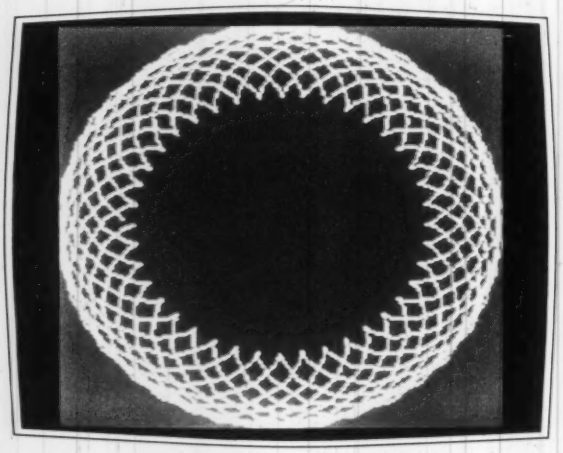
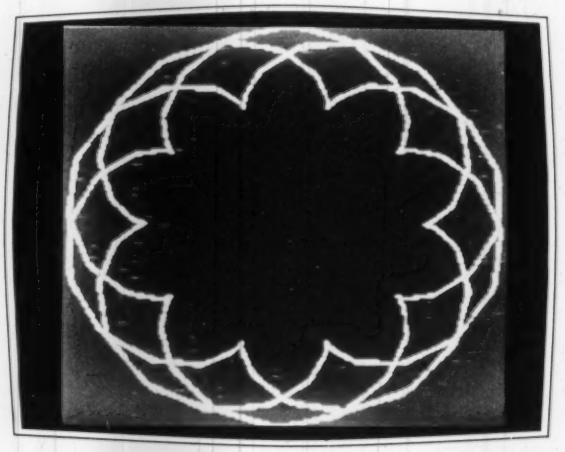


Figure 10.



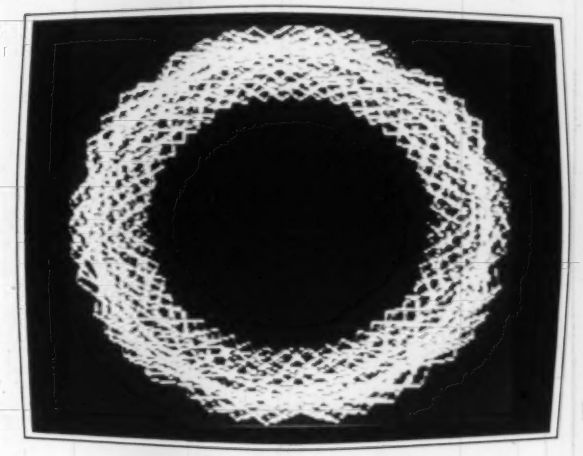


Figure 11.

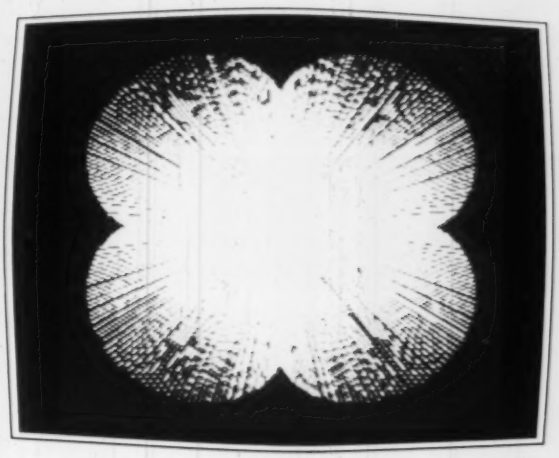


Figure 12.

To have the program operate quickly, the number of points plotted depends on the values of A and B up to a preset maximum of 400 points. This introduces an interesting feature.

When A and B are large, the 400 point maximum is not large enough for an exact portrayal of the graph. Instead, the program produces a tremendous number of rounding errors that produce even more intricate and dazzling shapes whose general outline is the correct epicycloid shape. For example, the pair (4000,1000) should reduce down to the same shape as (4,1), but the actual result is that shown in Figure 12. Similarly, Figures 13 and 14 show the results for the pairs (6000, 1500) and (8888,2222) respectively.

Actually, the designs shown in these figures convey only some of the artistic effects produced by the program. They

Listing 1.

```
10 PMODE 4,1
20 SCREEN 0,0
30 CLS
40 PRINT:PRINT:PRINT
50 PRINT "      THIS PROGRAM GRAPHS
60 PRINT
70 PRINT"       ANY EPICYCLOID"
80 PRINT:PRINT:PRINT
90 PRINT"PROGRAM WRITTEN BY FLORENCE AND    SHELDON GORDON"
100 PRINT:PRINT"COPYRIGHT 1983"
110 FOR T = 1 TO 1200 : NEXT
120 CLS
130 PRINT:PRINT:PRINT
140 INPUT "WHAT IS THE LARGE RADIUS";AA:PRINT
150 INPUT "WHAT IS THE SMALL RADIUS";BB : IF BB>=AA THEN PRINT:PRINT:GOTO140
160 C1=AA+BB
170 C2=C1/BB
180 DEF FNX(T)=C1*COS(T)-BB*COS(C2*T)
190 DEF FNY(T)=C1*SIN(T)-BB*SIN(C2*T)
200 A=0 : B = 6.28*BB
210 N1 = -C1-AA : N2 = -N1
220 M1 = N1 : M2 = N2
230 D=(N2-N1)/255 : E=(M2-M1)/191
240 PCLS
250 NR=20*(AA+BB)
260 IF NR>400 THEN NR=401
270 REM  DRAW GRAPH
280 SCREEN 1,1
290 H=INT((FNX(A)-N1)/D +.5)
300 V=191 - INT((FNY(A)-M1)/E+.5)
310 LINE(H,V)-(H,V),PSET
320 ST=(B-A)/NR
330 FOR T=A+ST TO B  STEP ST
340 X=FNX(T)
350 H=INT((X-N1)/D +.5)
360 Y=FNY(T)
370 V=191-INT((Y-M1)/E +.5)
380 LINE-(H,V),PSET
390 NEXT T
400 GOTO400
410 END
```

Figure 13.

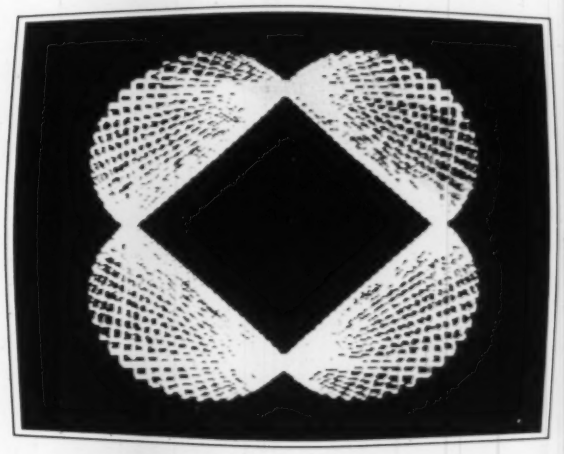
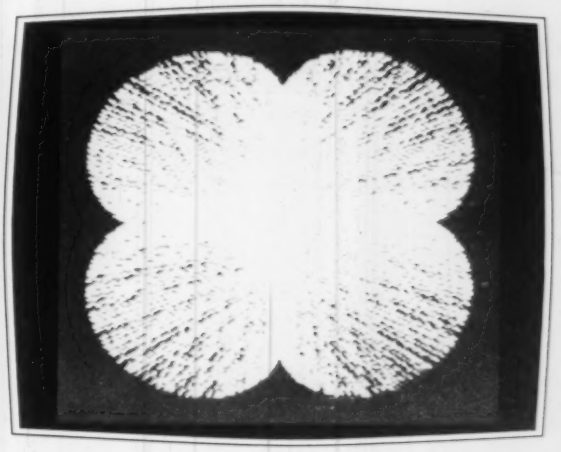


Figure 14.



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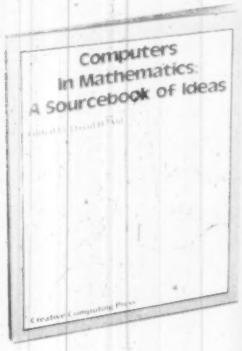

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are just the completed curves and as such are static in nature. In the process of the program running, however, equally striking patterns are constantly being produced and in turn being incorporated within even more complicated shapes.

This is truly an example of dynamic art which can best be appreciated as a process rather than as a final fixed shape. Further, as with no other art

Striking patterns are constantly being produced and in turn being incorporated within even more complicated shapes.

form, the computer lets you have an "instant replay" of the dynamic development of the pictures whenever you want to see the entire progression of shapes; just run the program again.

With these ideas and suggestions, you can now use the program to generate your own shapes for different values of the radii to enjoy the excitement of producing new shapes and, with a little curiosity and luck, possibly some new mathematical relationships and theories regarding the epicycloids.

Historical Note

In case you suspect that curves such as epicycloids are just figments of a mathematician's imagination, the following historical note is in order. Prior to the discoveries of Copernicus and Kepler in the period 1580-1600 AD on the structure of the solar system, the universally accepted view was geocentric: the earth was at the center of the universe and everything else—the planets and the stars—revolved around it.

Unfortunately, the apparent motion of the known planets conflicted with the idea that their orbits were circular or even elliptic. Picture, if you will, a model of the solar system as displayed in any planetarium. In particular, picture yourself on the moving earth and watch the motion of one of the other planets; it approaches closest to you at one point, then recedes in a wide arc and then comes back to the nearest distance somewhere else in the sky and so on.

It may not come as much of a surprise, at this point, that the ancient astronomers believed that the paths taken by the planets in their motion about the earth were nothing more than epicycloids.

Mousetrap

Michael Crichton

In a recent short story about a computer crime, I suggested that one could identify users on a computer system from their typing patterns: that the way a person types is as distinctive and individual as his fingerprint.

One reason to write fiction is that you're not obliged to be truthful or accurate; still, I found myself wondering whether the program I described, called Mousetrap, was feasible. An hour at the keyboard convinced me that it was.

The following program measures the interval between individual keystrokes as you type your name. A simple, empirically-derived algorithm determines whether a second entry of the name has been typed by the same or a different person. Of course, there are highly sophisticated techniques of multivariate analysis to perform the discrimination with elegance, if anyone wanted to take this proposition seriously.

But this simple listing is fun to experiment with. Type in your name, step aside, and let somebody else type the same name. And see whether the machine believes it.

Listing 1. Mousetrap for Apple.

```
10  REM  APPLE MOUSETRAP
20  REM
30  REM  BY MICHAEL CRICHTON
40  REM  10/25/83
50  REM
60  REM START ------------------
70  DIM N1(30),N2(30)
80 I = 768:OK = 2.25:NG = 1.5
90  HOME : PRINT "ACCEPTANCE LEVEL = ";OK:
    PRINT : PRINT
100  PRINT "LOGON:NAME? ";: GOSUB 380
110 T = 1
120  FOR X = 768 TO I
130 N1(T) =  PEEK (X):T = T + 1
140  NEXT : PRINT :N1$ = N$
150  REM  AGAIN ------------------
160 I = 768:T = 1
170  PRINT : PRINT "LOGON:NAME? ";: GOSUB 380
180  FOR X = 768 TO I
190 N2(T) =  PEEK (X):T = T + 1
200  NEXT : PRINT :N2$ = N$
210  REM  CHECKER ----------------
220  PRINT
230  IF N1$ <  > N2$ THEN  PRINT "SORRY, NO
    MATCH": GOTO 360
240  FOR X = 2 TO  LEN (N$) + 1
250 Z =  ABS (N1(X) - N2(X))
260 SZ = 3 - Z:SC = SC + SZ
270  NEXT
280  PRINT
290 L =  LEN (N$):SF = SC / L
300 SF$ =  STR$ (SF):SF$ =  LEFT$ (SF$,3)
310  PRINT SF$;"    ";
320  IF SF < NG THEN 350
330  IF SF > NG AND SF < OK THEN  PRINT
    "IDENTITY UNSURE BUT ACCEPTED": GOTO 360
340  IF SF > OK THEN  PRINT "IDENTITY
    CONFIRMED": GOTO 360
350  PRINT "YOU ARE A FAKE!"
360  END
370  REM  MOUSETRAP ITSELF -----------
380 N$ = " "
390 CT = 0
400 KB =  PEEK ( - 16384): IF KB > 127 THEN 440
410  INVERSE : PRINT " ";: NORMAL : PRINT  CHR$
    (8);: PRINT " ";: PRINT CHR$ (8);
420 CT = CT + 1: GOTO 400
430  REM  KEYBOARD WAS PRESSED
440  POKE  - 16368,0
450  POKE I,CT
460 KB = KB - 128:A$ =  CHR$ (KB): PRINT A$;:
    IF A$ =  CHR$ (13) THEN  RETURN
470 N$ = N$ + A$:I = I + 1: GOTO 390
```

Listing 2. Mousetrap for IBM.

```
10 REM IBM MOUSETRAP
20 REM
30 REM BY MICHAEL CRICHTON
40 REM 10/15/83
50 REM
60 DIM N1(30),N2(30),D(30)
70 T=1:REM TABLE VALUE
80 OK=1!: REM ACCEPTANCE LEVEL
90 NG = 2! : REM REJECTION LEVEL
100 CLS:PRINT "ACCEPTANCE LEVEL = ";OK;
    "          REJECTION LEVEL = ";NG
110 PRINT:PRINT
120 PRINT "LOGON:NAME? ";:GOSUB 420
130 FOR X=1 TO T
140 N1(X)=D(X)
150 NEXT
160 N1$=N$
170 REM ---- REPEAT ----
180 T=1
190 PRINT:PRINT
200 PRINT "LOGON:NAME? ";:GOSUB 420
210 FOR X=1 TO T
220 N2(X)=D(X)
230 NEXT
240 N2$=N$
250 REM ----- CHECKER ---
260 PRINT
270 IF N1$ <> N2$ THEN PRINT "SORRY, NO MATCH":
    GOTO 400
280 FOR X=2 TO LEN(N1$)+1
290 Z = ABS(N1(X)-N2(X))
300 SZ=3-Z:SC=SC+SZ
310 NEXT
320 PRINT
330 L=LEN(N$):SF=ABS (SC/L)
340 SF$=STR$(SF)
350 PRINT USING "\   \";SF$;"      ";
360 IF SF > NG THEN 390
370 IF SF < NG AND SF > OK THEN PRINT "IDENTITY
    UNSURE BUT ACCEPTED":GOTO 400
380 IF SF < OK THEN PRINT "IDENTITY CONFIRMED":
    GOTO 400
390 PRINT "YOU ARE A FAKE!"
400 END
410 REM ----- MOUSETRAP ITSELF -----
420 N$ = " "
430 CT=0:REM RESET COUNTER
440 K$=INKEY$:IF K$="" THEN CT=CT+1:GOTO 440
450 REM KEYSTROKE OCCURRED
460 D(T)=CT
470 A$=K$:PRINT K$;: IF K$=CHR$(13) THEN RETURN
480 N$=N$+A$:T=T+1:GOTO 430
```

Two new computers from HP, Scribe text formatter for 8201/Model 100, and two spreadsheets: PortaCalc and T Plan/N Plan

Notebook Computing

David H. Ahl

Lots of new developments to report this month. Also, we have tested several software packages. But a brief comment before getting started. The startup and growth of the notebook computer field has many parallels to the microcomputer field itself in the early days (1975-78).

Some of the manufacturers are big players and well financed while others, particularly the makers of add-ons and software, are entrepreneurial outfits consisting of two or three part-time people. It is a pleasure to deal with most of these small companies. They are responsive, and you don't have layers of assistants and secretaries or a PR agency to get through.

On the other hand, some of them are pompously trying to act like large companies instead of taking advantage of their strengths as entrepreneurial outfits. For example, we asked eight companies for review copies of software packages. We got five right away. But several required so many back and forth letters, non-disclosure agreements, and the like that by the time we received their packages, it was too late to get them into this issue. And in one case, we finally threw up our hands in total disgust.

Handheld from HP

New from Hewlett-Packard is the HP-71B, a handheld computer aimed at technical professionals. It is said to be optimized for numeric computation and calculation and includes enhanced Basic.

The 71B has a 64K ROM, quite large for a handheld unit, along with 17.5K of RAM. It has four plug-in slots for additional memory—up to 256K of ROM and 33.5K of RAM.

The 71B weighs 12 oz. and measures 3.9″ x 7.5″ x 0.5″. It has a one-line LCD display which shows 22 characters of a maximum 96-character line.

The extended Basic has over 240 instructions(!), dynamically declared variables, support of multi-line user-defined functions, and maintenance of multiple programs in memory. The 71B also has a calculator mode.

A wide variety of hardware add-ons and software packages are available for the 71B. In addition, it uses the standard HP Interface Loop to connect to a printer, data recorder, and measuring instruments. Price is $549.95.

Husky Hunter

The British-made Husky Hunter is a step above a handheld in both features and size (and price). The unit boasts CP/M compatibility and up to a 208K memory—amazing features for a unit this size.

The Husky Hunter has an 8-line, 40-character LCD display, the same as the Model 100/NEC 8201. As on some

Hewlett-Packard 71B.

larger systems, the display acts as a window on a much larger "virtual" display. This allows the unit to run many applications software packages designed for larger systems without modification. The LCD display also has full graphics capability on its 240 x 64 pixel screen.

The unit offers several built-in communications protocols including sync, async, and IBM 2780 bi-sync. This means that it can communicate with many larger computers, including mainframes, without intermediate hardware.

British Husky Hunter is hermetically sealed and has up to 208K.

The unit is housed in a diecast aluminum case and has 54 rubber keys. The case and keys are sealed and fully waterproof. But forget about touch typing; the keys are laid out in a rectangular pattern of four rows with no space bar.

The unit uses four rechargeable Ni-Cad batteries with a 14-hour operating life. It weighs 2.4 lbs. and measures 8.6″ x 6.2″ x 1.3″. Projected price is $2995 for an 80K unit and $4995 for one with 208K. The Husky Hunter is made by DVW Microelectronics; the U.S. agent is Sarasota Automation.

Sord IS-11 Notebook Computer

Sord has introduced a notebook computer, the IS-11, with integrated software for spreadsheet, database management, text editing, communications, and graphics. You'll find a complete review of it elsewhere in this issue.

Disk/Video Interface for Model 100

Tandy has announced a combination disk drive and video interface unit for the Model 100. The drive uses 5¼″ single-sided double-density floppy disks. Formatted capacity is 184K per disk. We haven't tried the drive, but it appears that it stores and retrieves programs and data sequentially (like a cassette tape) rather than having random access (like other floppy disks). Of course, the speed is much greater than a cassette tape.

The video interface allows the Model 100 to be connected to a standard NTSC video monitor or, using the built-in RF modulator, to a standard TV set. A monitor will display 25 lines of 80 characters while a TV set is limited to 40 character lines. All Model 100 characters are displayed, but dot graphics are not supported.

The Interface connects to the Model 100 through a 40-pin expansion connector on the bottom of the computer. When connected, the Interface automatically loads special software into the computer. The Model 100 must have at least 16K of memory.

Price of the Disk/Video Interface is $799. A second floppy disk drive costs an additional $240.

Hewlett-Packard Model 110

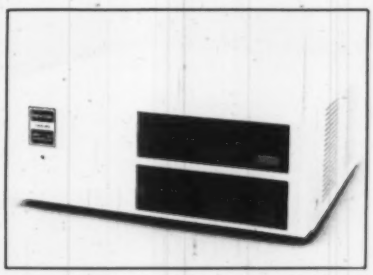
With the introduction of the revolutionary new Hewlett-Packard Model 110 Portable Computer, a new wave of serious portable computing has been unleashed.

The HP-110, which was code-named "Nomad," is a nine pound notebook-sized portable with a flip up screen. The display measures 80 characters across by 16 lines. An internal 300 baud modem and RS-232 interface provide the communications capabilities. Interfacing to disk drives and printers is done via the HP-IL Interface Loop. This is a low cost, low power interface that is used by other HP computers and instruments.

The 110 uses an 8086 processor and has 272K of continuous on board RAM. When the power is turned off, the memory is not affected.

The 110 will run for 16 hours on an overnight charge and the battery power level is always displayed at power up. If the power dips below five percent, the machine shuts itself off and the display cannot be turned on until the AC adapter/charger is attached.

Lotus 1-2-3 is actually built in ROM on the 110. The 384K of ROM also contain terminal software and MS-DOS. And HP's built-in Personal Applications Manager (P.A.M.) offers a Unix-like shell environment for file handling and management. Look for an in-depth evaluation next month in *Creative Computing*.



Disk/Video Interface for Model 100.

Scribe Text Formatter

Although manufacturers of many text formatting programs for the Model 100 and NEC 8201 call them word processing programs, they are not. The built-in TEXT program does the editing while the add-on program does the formatting. The *Scribe* program, however, goes one step further, and includes a name and address facility.

The basic *Scribe 3.0* package is a text formatter which allows formatting commands to be embedded in text files. In addition, several features are selected from the menu just prior to printing a file. Thus it operates very much like a word processing program on a desktop computer.

From the menu are selected the following: margin and line length, printer parameters (normal, double strike, emphasized), form of input (RAM file, cassette, or keyboard), line spacing, page numbering, number of copies to be printed, and halt at page end (Y or N).

Eighteen formatting commands can be embedded in the text. As with larger word processing packages, each command is preceded by a period which must be the first character on a line. The following commands can be embedded in the text:

Top margin of N lines
Bottom margin of N lines
Left margin, N spaces
Line length, N spaces
Indent N spaces
Center N lines of text
Skip N lines
Printer control
Page top title
Break, start new line
Break, start new page
Keyboard input
Comment—don't print
Justification on or off
Double width on or off
Append file
Bottom header
Hanging indent

From this list, it should be apparent that the package has practically every feature that one might need. However, in addition, the *Scribe 3.1* N & A Option includes additional features to print single width mailing labels; address envelopes; print names, addresses, and salutations in form letters; and print address file listings. This package is compatible with the Model 100 built-in ADDRSS and TELCON programs for input, review, and printing of name, address, telephone, and other data.

The basic *Scribe 3.0* program takes 2337 bytes of memory on the Model 100 (3081 bytes on the NEC) while the

Scribe 3.1 program occupies 3427 bytes on the Model 100 (3706 bytes on the NEC). We recommend keeping *Scribe 3.0* in the machine and loading *Scribe 3.1* only when, and if, you need its special features.

We found the 20-page "manual" adequate. It is a cross between a tutorial and a reference, but we missed having a real reference section summarizing all the commands and options. A nice touch is a small card listing all the embedded commands.

The package worked well and, when producing non-justified text, printed considerably faster than other packages we have tried. We did not like the fact that page numbers always appear in the bottom center of a page; we think that if a page has a header, the page number also should be at the top. We also feel that the package should recognize tabs within the text and not require you to use spaces; however, no package, except the one I wrote for NEC, treats tabs correctly.

One nasty aspect of *Scribe* when used with a NEC 8201 is that it expects the printer will be set so that a carriage return implies a linefeed (as TRS-80 computers require). But if the printer is set this way, it will not print correctly with LLIST, LPRINT, or the built-in print command. So to use the package as is, you must do much switching of printer DIP switches. You can correct this problem in line 1 by setting A=CHR$(13)+CHR$(10).

Despite these minor criticisms, we have no hesitation in recommending *Scribe* to anyone looking for a full-featured text formatter for a Model 100 or NEC 8201. Furthermore, the price is right—only $29.50. (*Scribe 3.0*) or $39.50 (*Scribe 3.1*) plus $2 shipping and handling from Chattanooga Systems Associates. The company also markets other packages for bookkeeping, tape file management, checking accounts, data indexing and general purpose calculations.

Skyline Porta Software

Skyline Marketing makes the Porta series of software packages for the Model 100 and NEC 8201. These include *PortaCalc* (a spreadsheet), *PortaStat* (statistics), *PortaFin* (financial calculations), *PortaMax* (linear programming), *PortaTax* (tax planning), and *PortaFolio* (stock portfolio analysis). We tried several of them, but we'll report on *PortaCalc* this month.

PortaCalc is a large program; the basic program takes 7580 bytes, but building and saving worksheets eats RAM the way elephants eat peanuts. You'll want at least a 24K machine, and 32K would be even better.

The PortaCalc package with PortaDex and PortaPrint is well designed, well supported, and gets the job done.

After loading *PortaCalc*, the top left of a worksheet shows on the LCD screen. As on larger spreadsheet packages, the screen is a window (four columns by six rows) on a larger worksheet (14 columns by 26 rows, for a grid size of 364 cells). This is quite small compared with *VisiCalc, Multiplan,* or *SuperCalc,* but, nevertheless, it will hold a year's worth of financial data as long as you don't need more than 26 rows.

Columns are labeled A to N and rows are A to Z; thus a cell is designated by two letters, column and row, say CK or AB. A right arrow followed by a cell causes a direct move to that cell. Each cell is nine characters wide.

Data entry is simple; you type a number followed by RETURN. The only format that can be set is the number of decimal places (0 to 7). As you enter data, labels, or formulas, they will appear in a command line at the top of the screen.

The functions which can be used in formulas include the four arithmetic operations, exponentiation, integer value, absolute value, sum (row or column), and average (of a row or column).

```
?_                                        C
 P------A-------B------C------D---
B|   123.00     9.60
C|   567.00    44.26
D|   246.00    19.20
E|----------------
F|  1281.00   100.00
G|
```

Figure 1. Screen dump of small PortaCalc worksheet.

```
PortaCalc Test

 345.00     26.93
 123.00      9.60
 567.00     44.26
 246.00     19.20
------------------
1281.00    100.00
```

Figure 2. Printout of PortaCalc worksheet.

Columns and rows can be inserted or cleared, but not deleted. You can also clear all values from a worksheet while leaving the formulas and labels intact. The replicate command will copy a formula into a new cell or range of cells with relative or constant values. You can specify the order of calculation: rows first or columns first.

Six of the function keys are used by the program for loading, saving, printing, and the like.

So there you have it—a bare bones but functional spreadsheet for the Model 100 and 8201. The manual is a slim 20 pages consisting of tutorial and reference sections and several examples. Also included is a handy, three-panel reference card which, frankly, is all you'll generally need to use the program.

You can save files to RAM or cassette, although Skyline also includes a program, PortaDex, which allows you to reformat files into the popular Data Interchange Format (DIF) used by *VisiCalc, Magicalc,* and some other programs. This is the format used, of course, in conjunction with the TELCOM program in the Model 100. This is a one-way operation—Model 100 to something else; there is no provision to download to the Model 100 (nor can we see any need for it).

Also included with the *PortaCalc* package is a text formatting program, PortaPrint. This provides most of the necessary functions: set margin, line length, page length, page headers, and page numbering (Y or N).

PortaPrint also recognizes three embedded commands for centering a line, making a line flush right, and page feed. Unfortunately, it doesn't have several needed functions such as an optional halt at page end (for single sheet printing), greater than single line spacing, or correct handling of tabs. Also, it is quite slow. Nevertheless, it is a nice little freebie that you get with the *PortaCalc* package, so it's hard to complain about it.

All in all, the *PortaCalc* package with PortaDex and PortaPrint is well designed, well supported, and gets the job done (as long as it fits) for just $69.95.

T Plan/N Plan

American Micro Products, Inc., (AMPI) has introduced full-featured spreadsheet programs for the Model 100 (*T Plan*) and NEC 8201 (*N Plan*). These programs give new definition to the word big. The basic program occupies 12,932 bytes, so while it is possible to run in a 16K machine with nothing else in memory, practical considerations dictate a 24K or 32K computer if you want to keep this program stored in it.

After loading, the screen shows the main program menu. From it you can select Setup, Edit, Save, Load, Print, Compute, Calculator, and Program Exit. Normally, you would start with Setup. Under Setup, you select the size of your spreadsheet—a maximum of 90 rows and 26 columns. Unless you have a great deal of free memory, you will not be able to approach both of these limits at the same time. We found that a moderately complicated 5 x 6 worksheet used 364 bytes, or about 15 bytes per cell. Thus if you have, say, 12K free, you could build an 800-cell worksheet (25 x 32 or 80 x 10).

After running Setup, you would select Edit. This shows a portion of the worksheet (four rows and four columns) along with function key definitions (bottom row), cell contents, and cell labels. Columns are labeled from A to Z and rows from 01 to 90. A cell, therefore, is defined by column and row, e.g., H24 or A01. You can move around the worksheet with the arrow keys or by using the "jump" function key.

After selecting the "fill" function key, you can enter data, labels, or formulas in the cells of the worksheet. Other function keys let you insert or delete rows or columns, replicate the contents of a cell (relative or constant values), or exit to the main menu.

T Plan/N Plan is by far the most comprehensive spreadsheet that we have seen for the Model 100 and NEC 8201.

Formulas can be up to 30 characters long and can use the four basic arithmetic operations, exponentiation, trigonometric functions, logs, absolute value, integer value, or change sign. In addition, *T Plan/N Plan* has seven special functions including summation, average, average of non-zero cells (a welcome, but seldom-found function), minimum and maximum of a range of cells, value as a percent, and percent change. In addition, formulas and functions can be combined. Prior to performing calculations, you can specify the desired order—rows or columns first.

After you have developed a worksheet, you can save it to RAM or cas-

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```
     A          B          C          D          E
01  :NEW-MAG   :   Jan    :   Feb    :   Mar    :1st Qtr
02  :Circula       1200    +B02*1.05   +C02*1.05  +[B02+D02]
03  :Adverts       1500    +B03*1.2    +C03*1.5   +[B03+D03]
04  :Newstnd        900    +B04*1.03   +C04*1.2   +[B04+D04]
05  : Total    +[B02+B04]  +[C02+C04]  +[D02+D04]  +[E02+E04]
```

Figure 3. T Plan/N Plan allows printing of worksheet formulas and labels.

NEW-MAG	Jan	Feb	Mar	1st Qtr
Circula	1,200.00	1,260.00	1,323.00	3,783.00
Adverts	1,500.00	1,800.00	2,700.00	6,000.00
Newstnd	900.00	927.00	1,112.40	2,939.40
Total	3,600.00	3,987.00	5,135.40	12,722.40

Figure 4. Final output from T Plan/N Plan enhanced with row spaces, varying width columns, and commas in long numbers.

sette; this saves everything: formulas, labels, and data.

The Print function key brings up an extensive menu of print selections including print input (formulas and labels), print output (the computed spreadsheet), insert blank rows, change column width, modify format (business or scientific notation), and delete row and column labels (the letters and numbers, not your labels).

The package also includes a basic calculator to help you do quick calculations without exiting the spreadsheet. This replaces a pocket calculator which, believe it or not, is frequently very handy to have when entering spreadsheet data.

The documentation with the program consists of a 93-page spiral-bound manual that includes an overview, tutorial instructions for all the basic operations, two sample problems, and appendices on loading, I/O, error handling, and a glossary of terms. It is very complete, although we certainly would have liked to see a command summary or reference card of some sort.

T Plan/N Plan is by far the most comprehensive spreadsheet that we have seen for the Model 100 and NEC 8201. Of course, it does not have all the features of *VisiCalc* or the other big guys, but it has more than enough for the majority of spreadsheet applications. And at just $65, it is an outstanding value for the dollar.

To further enhance its usefulness, AMPI offers three template packages. The Financial Management package has templates for stock portfolio analysis, home ownership, home budgeting, life insurance requirements, and a personal check register. It includes a cassette tape and 32-page manual.

Two business-oriented packages are available, one for general business management and the other for sales and marketing management; both have five templates. Template packages cost $29.95 each.

In addition AMPI has nine other packages for the Model 100 and NEC 8201 ranging from an equation solver to the Forth language.

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(615) 892-2339

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Metropolitan Life
Microsoft
Miracle Computing
Misco
Newsnet
Novation
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Practical Peripherals
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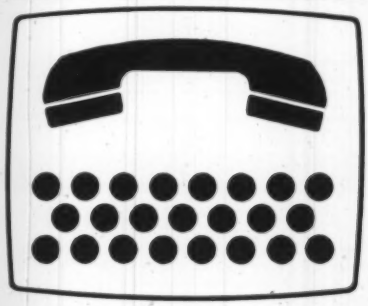

Telecommunications Talk

Brian J. Murphy

A Shameless Plug

It's customary for columnists here to start their pieces with a brief personal note or observation. For me it's getting hard to observe anything. As this is written your humble servant is in the middle of a miserable winter chest cold, the result of pushing himself through a string of 14- and 18-hour workdays to finish a book.

A sneaky way to slip in a plug for my book, isn't it? Actually, it is not a plug at all; since we don't have a definite title for the book yet, I can't tell you to go to your favorite bookstore and order them for you and all your friends. I'll do that next month, unless my editor stops me.

What I can tell you now is that the book is an introduction to computer wargames and fantasy games, covering rules, strategies, and some of the ways you can get the most out of your game playing time. It is tentatively scheduled to be released by Creative Computing Press in August. Am I excited? It is my first book, and it is the realization of my life's ambition to become an author, so you can imagine. I only wish I could get rid of this cold so I could enjoy the feeling.

So much for the plug. Now it is time to turn to the business of the current month, a profile of a unique information utility which serves the needs of commercial and scientific researchers—BRS.

The BRS System

BRS is not an information utility in the sense that CompuServe, The Source, and Delphi are. There are no games, no cutesy shopping services and no special interest groups.

The BRS system is a service designed to assist business, scientific, and professional users who need to compile lists of articles and publications in a variety of specialized fields to conduct research.

BRS started in 1976 as a bibliographic service for libraries, keeping these institutions apprised of publications in the scientific, medical, and technical fields. Although 1976 doesn't seem very long ago, it was before the personal computer revolution, back when libraries were almost the only potential market for BRS's service. With the advent of the personal computer, BRS sought to expand its market to include businesses; professional users such as doctors, lawyers, and scientists; and even private individuals.

The databases are designed to provide you not with articles but with a bibliography.

To that end BRS expanded the number of accessible databases it managed from about 20 to more than 80 (as of this writing) covering the broad areas of Sciences and Medicine, Business/Finance, Education, Social Sciences, Energy/Environment, and General Reference.

A few of these databases offer complete articles which can be dumped to your printer or printed off-line by BRS and mailed to you. These databases include Grolier's Academic American Encyclopedia (which is also available on CompuServe), the Harvard Business Review, and the Mental Measurements Yearbook.

The overwhelming majority of the databases are designed to provide you not with articles but with a bibliography—a list of articles and sources which treat the subject in which you have expressed interest. These citations make the job of the researcher infinitely easier, eliminating the need for a trip to the library to make a lengthy search through the Periodical Guide and other books and files detailing current publications.

Before we examine the database choices in detail, let's briefly explore how the system is used.

Bibliographic Searches

Although BRS claims that the system is "easy to learn," if you have no experience in database information retrieval, it will take you a little time to learn. Once you have learned the various logics which make the system run, you will come to appreciate the flexibility and versatility of the BRS approach. To fully appreciate what BRS can do, you have to see how BRS assembles data to meet your specific requirements. We are going to use a search compiled by BRS to illustrate the simplest search techniques.

We'll start after the sign-on and greetings have been completed by answering the prompt ENTER DATABASE NAME with the code for the

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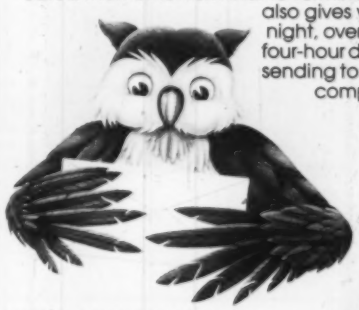

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ABI/Inform database (comprised of general business information), INFO. This response brings up the message BRS/INFO/MAY84 which tells us that the database is current up to May 1984.

Now we see a new prompt, 1: BRS-SEARCH MODE-ENTER QUERY. This is where the system asks us what information we want to extract from this file. The response COMPUTERS tells the system that we want all the article citations in the ABI/Inform bibliography which deal with computers.

The BRS system responds with RESULT 5878. This tells us that there are 5878 article citations in the database of articles and publications about computers. With nearly 6000 articles cited, this is an invitation to be more specific in your search.

So let's be more specific. It is easy enough to do because we can qualify our search by using the operators AND, OR, and NOT. In the next field we key in CRIME OR CRIMINAL OR FRAUD, and get 1022 response. Now let's combine these two fields to see how many articles deal with computers and criminal activity.

Before we do, let's look at what has appeared on the screen so far:

1: COMPUTERS
RESULT 5878
2: CRIME OR CRIMINAL OR FRAUD
RESULT 1022

Now, in field 3, we key in the response 1 AND 2. On screen it looks like this:

3: 1 AND 2

And the response at the end of field 3 looks like this:

RESULT 167

Now we have a resource of 167 article citations, dealing with various aspects of computer crime that we can list. If we want, we can get an even more specialized listing from this selection. In field 4 we can key in the request 3 AND LEGISLATION.

This response tells the system that you want the data sampling as defined in Field 3 (crime and computers) narrowed down to legislation dealing with computer crime. The response is RESULT 12. This means that in the file there are 12 article listings treating computer crime legislation.

A command to print brings up the listings themselves. The listing begins with the author's name (AU), the title of the article (TI), the source publication (SO) and an abstract (AB) of the contents. In a sample provided by BRS, the first listing of the article citations would appear as in Figure 1.

The system also allows you to order the citations to be printed off-line and forwarded to you for a small additional fee.

With this much information at your disposal, you can easily decide whether the article in question meets the needs of your research or not.

Root Word Searches

Sometimes it is hard for you to define precisely the parameters of your interest in terms the system can understand. To help you and the system to communicate better, you can do a root word search. In such a search you pick a root word like "computer" and enter the command ROOT COMPUTER in the first search field. The command and the response appear on screen as in Figure 2.

These terms, derived from the root search, are found in what is called the Dictionary File for the database you are accessing. If this search has turned up the search term for which you are looking, then when you return to the first search field, instead of having to type out COMPUTER-AIDED-LEARNING, you can simply enter the number of the term assigned in the root search, R2.

Another search option you have is to use operator words WITH and ADJ (adjacent) to home in on titles more precisely. If you were to search a database using the query COMPUTER WITH EDUCATION, the system would come up only with titles containing the words "computer" and "education." If you were to issue the query COMPUTER ADJ EDUCATION, then the system would pull up only those titles which contain the phrase "computer education."

Still another way to home in on the research material you need is to define the period of time you want to search. Suppose you want just the most current information on computer crime. When you access the INFO database you enter BRS/INFO/1983-MAY84. In this way, only those articles published from January 1, 1983 to May 31, 1984 will be cited.

Let's suppose that INFO contains articles in foreign language publications and that you do not want to include

Figure 1.

```
 1

AU  DENT, IKE.

TI  LEGISLATION PROPOSED AGAINST
    COMPUTER FRAUD

SO  CREDIT WORLD. V66N5 P.11.FEB 1978.

AB  STRONG DETERRENTS ARE NEEDED TO
    PROTECT OUR ECONOMY'S VITAL
    INFORMATION SYSTEMS FROM ILLEGAL
    TAMPERING. PASSAGE OF PROPOSED
    LEGISLATION WOULD MAKE IT A FEDERAL
    CRIME TO ACCESS A COMPUTER FOR
    PURPOSES OF COMMITTING FRAUD OR
    OBTAINING MONEY, PROPERTY OR
    SERVICES UNDER FALSE OR FRAUDULENT
    PRETENSES.
```

Figure 2.

```
1: ROOT COMPUTER


    COMPUTER$
R1  COMPUTER                  7575 DOCUMENTS
R2  COMPUTER-AIDED-LEARNING      1 DOCUMENT
R3  COMPUTER-AUDITS             81 DOCUMENTS
R4  COMPUTER-BASED               3 DOCUMENTS
R5  COMPUTERIZATION            162 DOCUMENTS
R6  COMPUTERIZE                 34 DOCUMENTS
R6  COMPUTERIZED               930 DOCUMENTS
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them in the bibliography because you can read only English. After you have defined the topic you want researched, in the next field you can include the command LG=EN, limiting citations to English language articles. Perhaps you can speak English and French. In that case, you can use the command LG-EN, FR and you will get only English and French language articles.

Another service which BRS offers is to send you updates on selected files. No matter what your area of interest, new articles are entering the literature all the time, and for some professionals, such as research scientists, lawyers, and physicians; it is very important to keep abreast of the latest published literature.

The BRS Selective Dissemination service (SDI) lets you know every time a new citation is added to the database in which you are interested.

The BRS Selective Dissemination service (SDI) lets you know every time a new citation is added to the database in which you are interested. The citations are printed off-line and sent by mail to the user. Unfortunately SDI does not cover all of the more than 80 databases of the BRS service, but it is carried by a representative sampling of them.

Database Selections

This brings us, rather belatedly I admit, to the subject of just what the BRS databases are. I don't propose to list them all here, but I could list some of the databases available for SDI as a representative sampling. They include Biosis Previews, Books in Print, Department of Energy Database, Energyline, Exceptional Child Education Resources, Government Printing Office Monthly Catalog, Harfax Industry Data Sources, Health Planning and Administration, Mathfile, Medlars, National Institute of Mental Health, Pollution Abstracts, Public Affairs Information Service, Religion Index, School Practices Information File and Social Science Citation Index.

As I said, those are only a few of the databases you can access—for a fee. The rate schedule is very complex, but the bottom line is: expensive. You don't need special hardware; most personal and home computers and modems will do fine—and you can save money if you have a printer and communications software that lets you dump the data to it.

You do have to pay to connect to the system, however. The least expensive way to do it, if you plan to use the system for a one-time research project for example, is with the hourly Open Access plan. There is a $50 fee, payable annually, for registration and your password. Then come the connect charges. The charges are assessed on an hourly basis and are highest for the Open Access user at $35 per connect hour.

There are four levels of annual subscription for users anticipating longer periods of use on the system. The least expensive subscription is $750. This buys you 25 connect hours for which you pay an additional $30 per. At the other end of the scale—attention: libraries and larger institutions—the rate is $3800 a year for 240 connect hours at an additional $16 per.

In addition to the connect charges there are also royalties which are charged for almost all the databases. They range from free (for a few of the BRS-generated files) to $75 for Digests of Environmental Impact Statements. Typical fees seem to fall within the $10 to $30 range.

But you are not off the hook yet. Don't forget telecommunications costs. You can access BRS directly ($3 connect hour), through Uninet ($6), Telenet Public Dial ($7 hour), Tymnet Public Dial ($11), or Telenet In-Wats ($26).

If nothing else convinces you that BRS is not for the casual user, these rates should do so. For libraries, government and charitable institutions, medical research facilities, academicians, and medical and legal professionals a BRS subscription can be a fantastic resource, however.

For the private individual working on a master's thesis or a doctoral dissertation—even for the serious undergraduate with the appropriate financial resources—the Open Access plan is the way to go. As expensive as it is, it can save you hours and hours.

For more information, contact BRS, 1200 Route 7, Latham, NY 12110. (800) 833-4707.

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If you have comments or criticisms regarding this column, if you want to set me straight on any topic, or if you have a contribution to make, you can do so by contacting me via The Source, CompuServe, or Delphi. Send Source E-mail to me via STU 393. My CompuServe E-mail "address" is 70426,143. My mail at Delphi goes to BJMURPHY. I'm looking forward to hearing from you.

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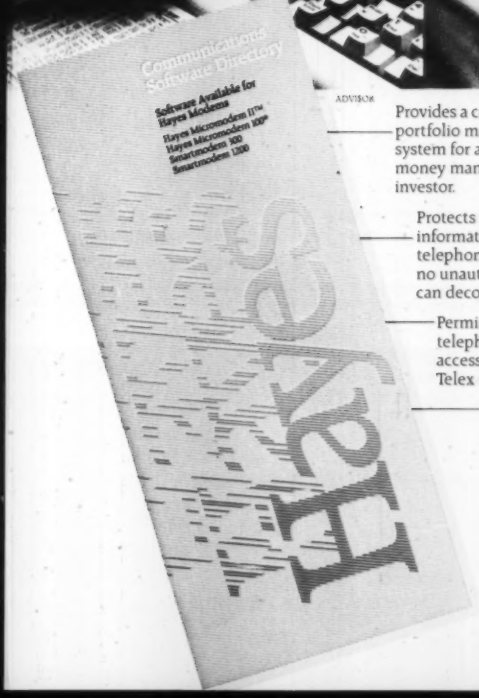

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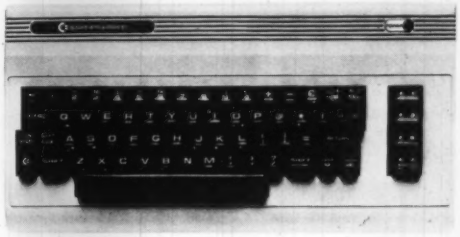
*FCC approved in U.S.A.
**DOC approved in Canada
1983 Hayes Microcomputer Products, Inc.

CIRCLE 132 ON READER SERVICE CARD



Commodore's Port

John J. Anderson

Gee whiz, I want to tell you. Lot's going on in the Commodore arena, and it's really hard to keep up anymore. More and more new hardware and software products, more great packages meriting review, and more applications than you can shake a disk at. We need more room! Maybe *Creative* should become Commodore specific! Just kidding, Atari fans.

See John Run

No, but seriously, folks. I want to lead off by extending my sincere thanks to a Karl T. Thurber, Jr, of Millbrook, AL. In the March issue of *Run* magazine, Karl said some very kind words about my old Baby Driver program for the 1540 disk drive.

In an article entitled "Bringing Up Commodore," he described Baby Driver for more than four paragraphs, and wrote, "I place it on practically every disk . . . I find it very easy to use, and it can be used whether or not the Wedge programs have been loaded. Some users may even prefer the Baby Driver over the still-cryptic Wedge by virtue of its simple, menu-driven operation."

Karl, old buddy, you made my month. And if you liked Baby Driver, which was written way back in the winter of 1982, you'll *love* MiniDos Menu 2.0, which appeared in our May issue. It is designed specifically for the C-64 and 1541 drive, and has many significantly improved features. So type it in, okay?

And all you other C-64 owners out there—you type it in, too.

Run, John, Run

It just goes to show you. If an unfortunate soul reads only *Run*, he first learned about Baby Driver in March, 1984. The enlightened *Run* contributor, i.e. Mr. Thurber, who never misses an issue of *Creative Computing*, has not only known about the virtues but had a copy of Baby Driver since Christmas of 1982. And now he will have a copy of the improved version. It's enough to make a micromag publisher Green with envy.

And due to overwhelming demand (four letters so far), this month we present the Vic version of Menu 2.2. Just when Vic owners thought it was safe to go back in the water. Warm up your machines and limber your fingers. And don't *Run* away.

Another Winner

This month we have *another* debut application, by my Commodore-maven buddy Robert Alonso, that without a doubt will also set other Commodore micromags swiftly ahemming and hawing. Let's hope they credit *Creative Computing* for this one, too. It runs in a mere 20 lines, and I guarantee you will want to type this one in. But I mention this now only to whet your appetite. First let's look at the menu.

Menu: a Vic MiniDos

Listing 1 is version 2.2 of Menu for the Vic, a Basic program that makes working with the 1541 disk drive much easier. Figure 1 will help you locate all the special graphics characters you'll need to type in. Every line in which they appear is indicated in the figure.

The real utility of the Menu program is knowing that a copy of it resides on every data disk you own. When you power up, type LOAD "MENU", 8 then press RETURN. When the Vic comes back with a READY, RUN the program.

Automatically upon the program RUN, a disk directory will be provided. First the name and extender of the current disk are listed. Then the lengths, names, and types of files appear. After the directory is completed, a menu prompt of choices appears. You pick a letter, hit RETURN, and the chosen process is automatically carried out for you.

Here is the roster of functions Menu can perform:

- (←) RUN—allows you to autorun any program in the directory.
- (F)ORMAT—formats a disk.
- (C)OPY—allows you to copy a file under a new filename.
- (E)RASE—deletes a file from disk.
- (D)IRECTORY—lists the files on disk.
- (*)CHECK ERROR STATUS—queries the error channel on the disk drive.
- (R)ENAME—allows you to change the name of any file.
- (W)RITE MENU—automatically puts a copy of the Menu Program itself out to disk
- (Q)UIT MENU—eliminates the Menu program from memory and brings you back out to Basic.

For more detailed documentation on the program, see last month's Commodore's Port.

Simple Screen Save

Okay, sound the trumpets. For more than a year now, I have been trying to develop a short and simple character graphics screen save routine for the C-

commodore 64

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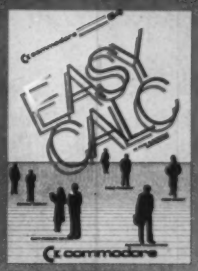

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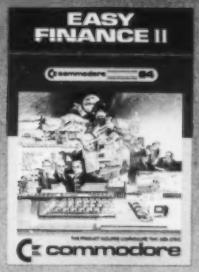
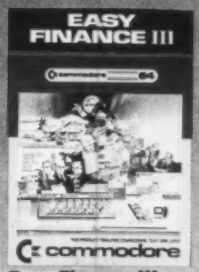
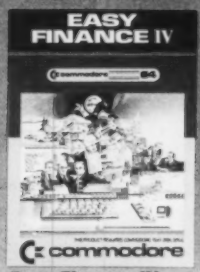


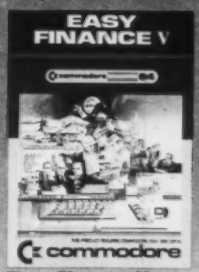
Easy Finance II—Basic Investment Analysis
16 stock investment functions. Investment bar graph.



Easy Finance III—Advanced Investment Analysis
16 capital investment functions. Bar graphs.



Easy Finance IV—Business Management
21 business management features. Bar graphs.



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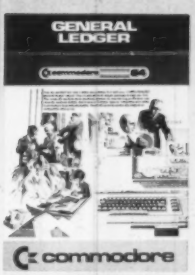

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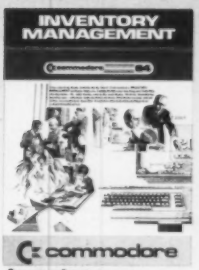

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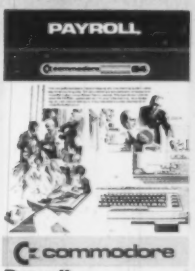

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Listing 1.

```
1 REM VIC MINIDOS MENU

2 REM VERSION 2.2 3/84

3 REM JOHN J. ANDERSON

20 GOSUB 200
30 PRINT"----------
--------"
40 PRINT"←)RUN, F)ORMA
T, C)OPY"
45 PRINT"D)IRECTORY, E
)RASE"
50 PRINT"*)ERROR STATU
S, Q)UIT"
60 PRINT"R)ENAME, W)RI
TE MENU"
70 PRINT"----------
--------"
80 INPUT X$
90 IF X$="D" THEN GOSU
B 200
100 IF X$="F" THEN GOS
UB 300
110 IF X$="C" THEN GOS
UB 400
120 IF X$="E" THEN GOS
UB 500
130 IF X$="W" THEN GOS
UB 600
140 IF X$="Q" THEN GOS
UB 350
150 IF X$="*" THEN GOS
UB 650
160 IF X$="←" THEN GOS
UB 550
170 IF X$="R" THEN GOS
UB 450
180 GOTO 30
200 PRINT:PRINT
210 PRINT:PRINT:PRINT"
■----------
-"
220 PRINT "VIC MENU 2.
2  --  JJA"
223 PRINT"----------
---------"
225 PRINT"■LEN ■NAME
    ■TYPE"
230 PRINT"■----------
----------"
251 OPEN 1,8,0,"$"
252 GET #1,A$,B$
254 GET #1,A$,B$
256 GET #1,A$,B$
258 C=0:IF A$()""THEN
C=ASC(A$)
260 IF B$()""THEN C=C+
ASC(B$)*256
262 PRINT"■"MID$(STR$
(C),2);TAB(4);"■";
264 GET #1,B$:IF ST()0
THEN 282
266 IF B$()CHR$(34)THE
N 264
268 GET #1,B$:IF B$()C
HR$(34) THEN PRINTB$;:
GOTO268
270 GET #1,B$:IF B$=CH
R$(32) THEN 270
272 PRINT TAB(17);:C$=
""
274 C$=C$+B$:GET #1,B$
:IF B$()""THEN 274
276 PRINT"■"LEFT$(C$,
3)
280 IF ST=0 THEN 254
282 PRINT"BLOCKS FREE■
"
284 CLOSE 1:RETURN
300 REM FORMAT DISK
305 PRINT"INSERT DISK
TO BE"
306 PRINT"FORMATTED.":
PRINT
310 PRINT"INPUT DISK N
AME" :INPUT DISK$
320 PRINT "1NPUT DISK
NUMBER":INPUT EXT$
325 MACRO$="N:"+DISK$+
","+EXT$
330 OPEN 15,8,15,MACRO
$
340 CLOSE 15:MACRO$=""
:RETURN
350 REM EXIT PROGRAM
380 PRINT"EXIT TO BASI
C.":NEW
400 REM COPY FILE
410 PRINT"INPUT SOURCE
 FILE NAME" :INPUT DIS
K$
420 PRINT "INPUT NEW F
ILE NAME":INPUT NWS$
425 MACRO$="C:"+NWS$+"
="+DISK$
430 OPEN 15,8,15,MACRO
$
440 CLOSE 15:MACRO$=""
:RETURN
450 REM RENAME FILE
460 PRINT"INPUT OLD FI
LE NAME" :INPUT DISK$
470 PRINT "INPUT NEW F
ILE NAME":INPUT NWS$
475 MACRO$="R:"+NWS$+"
="+DISK$
480 OPEN 15,8,15,MACRO
$
490 CLOSE 15:MACRO$=""
:RETURN
500 REM DELETE FILE
510 PRINT"INPUT FILE N
AME TO"
515 PRINT"DELETE":INPU
T DISK$
520 PRINT"HIT (RETURN)
 TO DELETE":INPUT X$
530 MACRO$="S:"+DISK$
535 OPEN 15,8,15,MACRO
$
540 CLOSE 15:MACRO$=""
:RETURN
550 PRINT"TYPE IN FILE
NAME"
560 PRINT"TO RUN, HIT
(RETURN)"
570 INPUT N$:LOAD N$,8
:RUN
600 REM SAVE MENU FILE
610 PRINT"INSERT DISK"
:PRINT
620 PRINT"HIT (RETURN)
":INPUT X$
625 OPEN 1,8,15
630 SAVE "MENU",8
635 CLOSE 1
640 RETURN
650 OPEN 1,8,15
660 INPUT#1,A,B$,C,D
680 PRINT"ERROR STATUS
":PRINT:PRINT"ERROR #
";A
685 PRINT B$:PRINT"TRA
CK ";C,"SECTOR ";D
690 CLOSE 1:RETURN
```

Character	Function	Keypress	Line(s)
♥	Clear screen and home cursor	SHIFT CLR	210
←	Blue	CTRL BLU	210,225,230 262,282
£	Red	CTRL RED	225,262
↑	Green	CTRL GRN	225,276
R	Turns inverse on	CTRL 9	262,276
■	Turns inverse off	CTRL 0	262

Figure 1.

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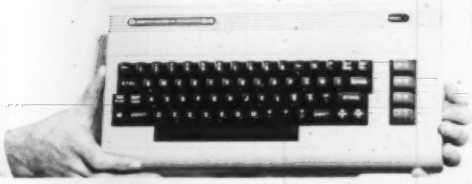

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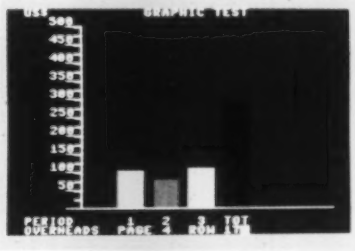

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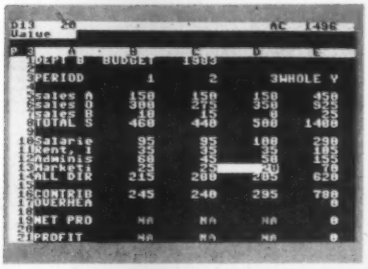

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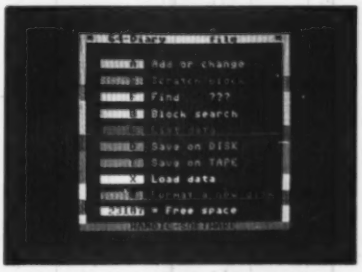

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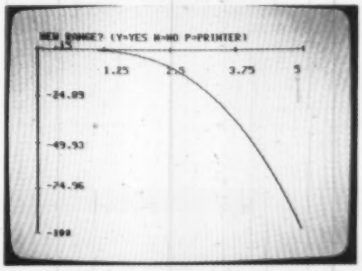

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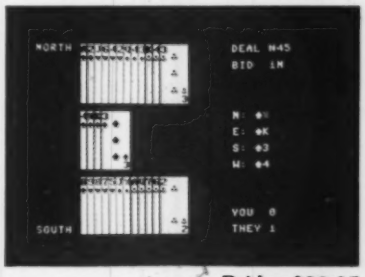

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CIRCLE 159 ON READER SERVICE CARD

Commodore's Port, continued...

Listing 2.

```
0 REM ******************************
1 REM *                            *
2 REM *   SKETCH, SAVE, AND LOAD   *
3 REM *   ROBERT ALONZO 11/11/83   *
4 REM *                            *
5 REM ******************************
6 P=PEEK(197):POKE 53280,0:POKE 53281,0
7 SC=1024:CR=55296:BC=53280:C$=" "
8 INPUT"{CLR}NAME OF DRAWING";A$:PRINT"{CLR}"
9 GET B$:IF B$=""OR B$=CHR$(34) THEN B$=
"+"
10 IF P=2 OR P=7 OR P=1 THEN C$=" ":PRI
NT C$;
11 IF B$="{BLK}" THEN PRINT C$:GOTO 15
12 IF B$="{WHT}" THEN PRINT C$:GOTO 19
13 IF B$="{RVS}" THEN PRINT C$:END
14 PRINT B$;:GOTO 9
15 FOR X=1 TO 15:POKE BC,X:NEXT
16 OPEN 2,8,2,"0:"+A$+",S,W"
17 FOR X=0 TO 999:S=PEEK(SC+X):C=PEEK(CR
+X)
18 PRINT#2,S:PRINT#2,C:NEXT:CLOSE 2:GOTO
 9
19 FOR X=1 TO 15:POKE BC,X:NEXT
20 OPEN 2,8,2,"0:"+A$+",S,R"
21 FOR X=0 TO 999:INPUT#2,S,C:POKE SC+X,
S
22 POKE CR+X,C:NEXT:CLOSE 2:GOTO 9
23 OPEN 15,8,15:INPUT#15,W$,X$,Y$,Z$
24 PRINT"{CLR}",W$,X$,Y$,Z$
25 CLOSE 15
```

64. Embedding color character graphics in PRINT statements is highly unsatisfactory for a number of sticky reasons. First, it limits the size of the graphic. Second, the process of *composing* multicolor images becomes a nightmare. The complexity stifles creativity in a hurry. Color-change characters themselves displace the graphic image to the right, one space per color change. Allowing for them is akin to thinking in Esperanto.

What is needed is a program that allows the cursor to move freely, so you can compose an image, then save the whole screen to disk.

I have seen similar programs for hi-res screens, but tried in vain to design a character graphics version. Then, in frustration, I gave the project to my good friend Robert Alonso, who knows the C-64 better than I know the back of my hand. He did the job in 20 lines of code. I tuned it up a bit, got it to run a bit more smoothly, and made it a little easier to use, but Listing 2 is his program.

I'm going to give Robert the floor, so to speak, to take you through the mechanism of the screen save program. I think it is among the most useful short programs I have seen for the C-64. It makes saving and retrieving color character graphics screens utterly simple.

Take it away Robert!

* * *

Designing a title screen is often the most tedious part of programming. The programmer must not only decide how he wants the screen to look, but also *how* he plans to make it look that way. The usual choices are either to POKE the layout of the screen or to PRINT the layout. On the Commodore 64, it is more practical to PRINT the layout because it is much faster and because both the image and the color can be placed on the screen simultaneously. With POKEs, each character would have to be POKEd into screen memory (which starts at 1024 ($0400) and the color would have to be POKEd into the corresponding color memory location (which starts at 55296 ($D800).

Fortunately, there is an easier way. A programmer can just create his design and colors with a screen editor that saves the finished screen to the disk drive. The saved screen can then be accessed by any program that has the appropriate subroutine for loading the screen. This can be particularly useful if a series of programs uses the same or similar title screen layout.

The program shown here as Listing 2 is a simple but effective screen editor for the Commodore 64. Figure 2 lists the graphics characters in the program. In writing the program I tried to minimize the time necessary to load and save a screen to a 1541 disk drive. I have found that saving an entire screen with color takes about one minute and 20 seconds, while loading the same screen takes about 53 seconds. Almost every key is allowed by the program (including the STOP/RESTORE keys, so be careful). All the colors are accessible by using the CONTROL key and a number or the COMMODORE key and a number. Reverse characters can be used simply by pressing the CONTROL key and the 9 to enable it or the 0 to disable it. All the graphics characters are accessed with the SHIFT and COMMODORE keys.

When you run the program, it prompts you for the filename you want to use for the screen. You must keep the name shorter than 16 characters to avoid an error message when saving. Once you enter the filename and hit RETURN, you are in the edit mode. Now you can proceed to design your screen using the cursor keys to move the cursor around. Please note that in addition to being a good editor for designing title screens, the program is also adequate for teaching the fundamentals of word processing to a beginner.

The limitations of the program are that only one screen can be done at a time and that text will scroll off into oblivion if the cursor attempts to go beyond the last screen line. Another disadvantage is that you can't directly PRINT to the bottom righthand corner. Instead, you must PRINT whatever you want in that corner one space to the left of it, move the cursor to the left of what you PRINTed, and hit SHIFT-INSERT

Character	Function	Keypress	Line(s)
	Cursor left	SHIFT ⇐CRSR⇒	7, 9, 10
	Clear screen and home cursor	SHIFT CLR	8, 24
	White	CTRL WHT	8
	Diamond	SHIFT Z	9
	F1	F1	11
	F2	F2	12
	F3	F3	13

Figure 2.

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CIRCLE 207 ON READER SERVICE CARD

once. Your character will then be forced into the corner.

If, while using the program, you decide that your screen really isn't what you had in mind, you can erase it without having to exit the program. Just hit SHIFT-CLEAR.

At any point in the program, you have the option of saving the screen, loading a screen that has already been saved, or exiting the program. These options are accessed by hitting function key *1 to save*, function key *3 to load*, or function key *5 to exit* the program. I have included a very short routine at the beginning of the save and load routine to flash different colors on the border. The routine was included to confirm that a save or load is taking place. If you should ever experience a problem loading or saving you can hit RUN/STOP-RESTORE and in immediate mode type GOTO 23. You will then get a printout of the error condition.

Once you have a screen finished and saved, you can include it in a program by adding four lines at the beginning of that program. The first line should include the given values for the variables SC and CR, the filename you gave the screen assigned to A$. Add too, if desired, two POKEs, one to set the border color and one to set the screen color. The next three lines should be equivalent to lines 20-22 of the given program. Remember to delete the GOTO 8 in line 22 so it doesn't affect the flow of your program. Although the routine I have described works well, you can improve on it by first blanking the screen and then, when the screen has been loaded, bringing it back. The following two POKEs are necessary to do this:

POKE53265,PEEK(53265)AND239–blank screen

POKE53265,PEEK(53265)OR16 – reset screen

Program Revealed

Line 0-5: Remarks to remind the user of the purpose of the program and the author.

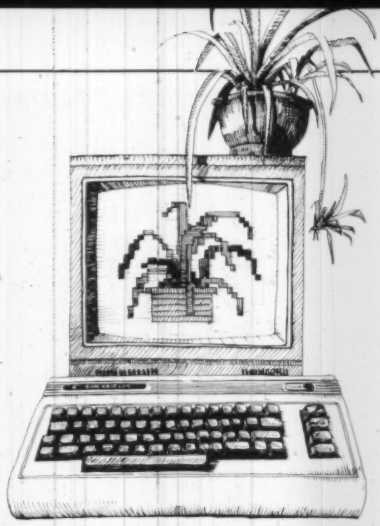
Line 6: Checks the keyboard for input; colors screen black.

Line 7: Initialization of the variables SC, CR, BC, and C$. SC is the start of screen memory. CR is the start of color memory. BC is the border color register. And C$ is a string used in the program to keep the cursor from moving on its own.

Line 8: Prints the filename input prompt in white, accepts the input, assigns it to A$, and clears the screen.

Line 9: Gets input from the keyboard and assigns the cursor shape to B$ if the input is null or a quotation mark.

Line 10: Uses the input from line 6 to



test if any cursor key or the RETURN key has been hit. If any of the keys has been hit, then C$ is printed to erase the cursor from its present location.

Lines 11-13: Test to see if function key 1, 3, or 5 has been hit. If so, a save, load, or exit takes place.

Line 14: Prints the key which was struck on the current cursor position and returns the program to line 8 to form a continuous loop.

Line 15: Steps the register for border color through its 15 possible colors.

Line 16: Opens a sequential file to write to the disk drive (device 8) with the name A$.

Line 17: Begins a FOR-NEXT loop that PEEKs the values from the screen RAM and color RAM and assigns them to S and C respectively.

Line 18: Completes the FOR-NEXT loop from line 17 by storing S and C to the opened file (#2) on the disk drive. Once the loop is finished, the file is closed and program control is sent back to the loop beginning at line 8.

Line 19: Steps the register for border color through its 15 possible colors.

Line 20: Opens a sequential file to read from the disk drive (device 8) with the name A$.

Line 21: Begins a FOR-NEXT loop that INPUTs the values S and C and POKEs the S value into the screen RAM.

Line 22: Completes the FOR-NEXT loop from line 21 by POKEing the C value into the color RAM. Once the loop is finished, the file is closed, and program control is sent back to the loop beginning at line 8.

Line 23: Opens the command channel to the disk drive to check the error status by INPUTing the string values W$, X$, Y$, and Z$.

Line 24: Clears screen, and prints the strings for reference.

Line 25: Closes the command channel and ends the program.

* * *

Beautiful. One more thing you might want to do to improve the program is to add the line POKE 650,128 somewhere near the beginning of the program. This will give you an autorepeat function on every key. This comes in very handy when creating graphics patterns with multiple keystrokes.

Mailbag

This one came in from John Dayton, of Lilburn, GA:

I am writing this letter to share my experience with you and your readers regarding the video quality of the C-64. I was trying to reach a decision on which home computer would best meet my needs when a friend showed me your video quality article in the August issue. My concern nearly scared me off the C-64.

After reading your article, I started thinking about alternative approaches. Initially I wanted to hook the micro up to the family TV, but soon decided that if everyone was to remain happy I needed a separate monitor or TV. Faced with the expense, I preferred the flexibility of another TV. But what about video quality?

Being the owner of a videocassette recorder, I reasoned that it might pay to bypass the RF modulator in the C-64. I bought a utility cable from a local computer store and ran the video and audio output directly from the Commodore to the video and audio in jacks on the VCR. Now the Commodore video can ride into the TV via the superior VCR modulator.

The video quality using this method is excellent and rivals that of a dedicated monitor. I'm confident that all home computer/VCR owners will find that this approach works very well.

* * *

An ingenious approach, John. I'm going to have to give that a try.

Save and Replace Clarification

Since readers have continued to write in with the same question, allow me to answer once again a question I answered, albeit incorrectly, about a year and a half ago. You *can* save a file under its existing filename, replacing the original file with the modified contents. The command is

SAVE"@0 :FILENAME",8

Sorry for the booboo. My only excuse is that the preliminary documentation for the 1541, with which I originally made an evaluation of the drive, makes the current manual read like Shakespeare.

That's about all for this time. Next month, back to reviews and new products. *Auf wiedersehn.*

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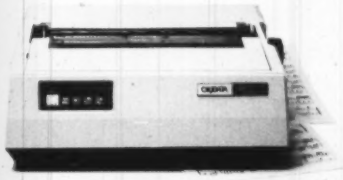

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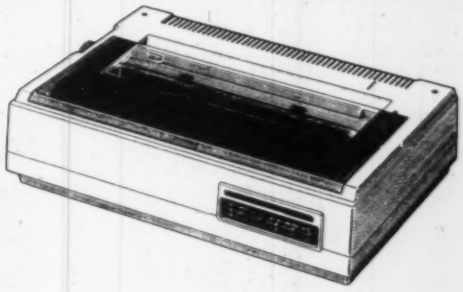


Print About Printers

John J. Anderson

"June is bustin' out all over" . . . well not exactly. But you get the idea. Who really cares, anyway? We're here to talk about printers. And that's exactly what we're going to do. We're going to talk slew rates and duty cycles. The only daisies we know about around here are totally inedible. So let spring advance outside while our paper advances inside. Here we talk hard copy.

For openers this month, I thought it might be a nice idea to put together a list of all the popular and easy-to-find machines we have reviewed, and do a mini-Street Price Index for them, the way we have done for micros at the head of the book. The 20 most popular and available machines appear as Figure 1. The chart lists the machines in price order and indicates whether each is dot matrix or daisywheel. For your reference, it also lists when each unit was reviewed in the pages of *Creative Computing* and the lowest street price we have recently seen advertised for each model.

Star made a name for itself about six months ago with the introduction of the Gemini series of printers.

Before you begin the inevitable deluge of angry letters and phone calls, read this pre-emptive strike attempt first, okay?

• Number 1: The entries themselves have been chosen based on perceived popularity and availability, not necessarily quality. The perception is solely mine. My criteria: these are the printers we get the most queries about and the models that have been carried by the most dealers in the most places for the most time. If the printer you just bought or are considering, or worse yet, the printer company you *work for*, is not represented on the chart, please *don't* freak out. Omission does not imply that a printer is no good. It simply means it is not included in the chart. You may have a fine product that is simply a little bit hard to find or not commonly carried by discount dealers.

• Number 2: Please do not badger us to find out exactly *where* we found the specific street prices. Follow the ads in this magazine, and low-price mail-order resources like *The Computer Shopper*, P.O. Box F, 407 S. Washington Ave., Titusville, FL 32796. (305) 269-3211. Tell Stan Veit I sent you.

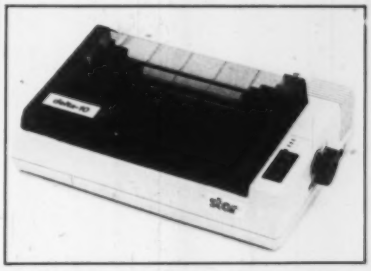
Unfortunately, price quote inquiries to *Creative*, even when accompanied by a SASE, will not be acknowledged or returned.

The chart is included here for purposes of comparison and to underscore how dramatically some printer prices have recently dropped. If the SCM TP-II had been retailing for $269 the day I took it out of the box for evaluation, I wouldn't have been nearly as hard on it as I was. For $269, it is a good performer. And look at the kind of bargain you can now get on the Mannesmann-Talley 160L. The $578 street price represents a whopping drop—nearly 50 percent off the price we originally quoted back in June of 1983.

And if you shop around, I'll bet you can even beat many of these listed prices.

Star Micronics Delta-10

Star made a name for itself about six months ago with the introduction of the Gemini series of printers. As you can see in Figure 1, the Gemini-15 is the least expensive 15" width printer on the market today—less expensive than many low-cost 8½" models.



Star Micronics Delta-10.

Now the Delta-10 has made its appearance, at a list price of $595 but already being heavily discounted, as borne out by Figure 1. For the money, the Delta-10 has features that blow many of its competitors away.

At first glance the machine closely resembles the FX-80 and the gaggle of Epson work-alikes (including the Gemini series) that have sprung up like mushrooms in the last year or so. But upon closer inspection, the Delta begins

to stand out. It has all the features we have come to expect from machines that strive to match the Epson, including six clear and crisp descender typefaces (see Figure 2), a print speed of 160 cps in the draft mode, and true bi-directionally logic-seeking linefeeds.

The machine takes sprocket or friction feed paper, offers three character pitches, a self-test, and the capability to download special character sets. It offers unidirectional bit-image graphics and 136 columns in the 17 pitch mode.

The Delta-10 is much more sturdily-built than its less expensive Gemini cousins and displays a physical quality standard rivalling that of Epson. The paper feed speed is 10 lines per second, which, when combined with a print speed of 160 cps, makes for mighty fast throughput.

One of the most attractive features of the machine is that it offers both serial and parallel interfaces as standard equipment. That may or may not count for much with you, but it counts for quite a lot here at the lab, where printers are guaranteed to be hooked up to a variety of machines. Serial-only printers are getting more and more scarce, and dual-interface machines are becoming more prevalent, it seems. If you need both interfaces, the Delta-10 is far and away the least expensive printer on the market offering parallel and serial hook-up "out of the box," as we say.

The Delta-10 runs quietly, and paper feed is smooth and sure. The rake of the platen cover and well-designed paper separator racks keep incoming and outgoing fanfold paper well away from each other at all times. The ribbon is spool-type, a bit annoying to change but simple enough. Spool ribbons remain a more economical approach to print quality than cartridge ribbons.

I know it is silly to continually nitpick about DIP switch placement, but the Delta-10 is another of those machines that requires taking the top cover off to get at them. Some day they will pass a law, and then all DIP switches will require only a pencil and 20 seconds—as opposed to a screwdriver and ten minutes—to configure.

The documentation is profusely illustrated, but too terse in places. In all fairness, my manual was labeled "preliminary." Perhaps they will do better in time.

Printer	Matrix/ Daisy	When reviewed	Lowest price
Gorilla Banana	M	Mar '83 (Seikosha GP-100A)/Nov '83	$179
SCM TP-II	D	Jan '84	269
Gemini-10X	M	Aug '83	278
Mannesmann-Tally Spirit-80	M	Oct '83	299
Riteman	M	Dec '83	329
C. Itoh Prowriter 8510	M	Mar '83	340
Gemini-15	M	Aug '83	358
NEC-8023	M	Mar '83	365
Okidata ML92P	M	Mar '83/Apr '84	429
Transtar T315	M (color)	Jan '84	439
Star Delta-10	M	In this issue	469
Juki 6100	D	May '84	499
Epson FX-80	M	Jan '84	518
Mannesmann-Tally 160L	M	Jun '83	578
Okidata ML93P	M	Apr '84	689
NEC-8025	M	Mar '83	699
Epson FX-100	M	Jan '84	725
DaisyWriter 2000	D	Mar '83/May '84	999
Qantex 7020	M	Apr '84	1495
Qantex 7030	M	Mar '83/Apr '84	1695

Figure 1.

On the whole the Delta-10 tested well. Its 9x9 dot matrix compares literally point-for-point with the Epson, and comes close to letter quality in the emphasized mode. If you were thinking about an FX-80 but need a serial/parallel machine, the Star Delta-10 is a logical choice.

Bytewriter Model 900

Bytewriter made its early reputation marketing the models 0-35 and 0-40. These are Olivetti Praxis electronic typewriters specially interfaced to act as printers. Now the company offers the

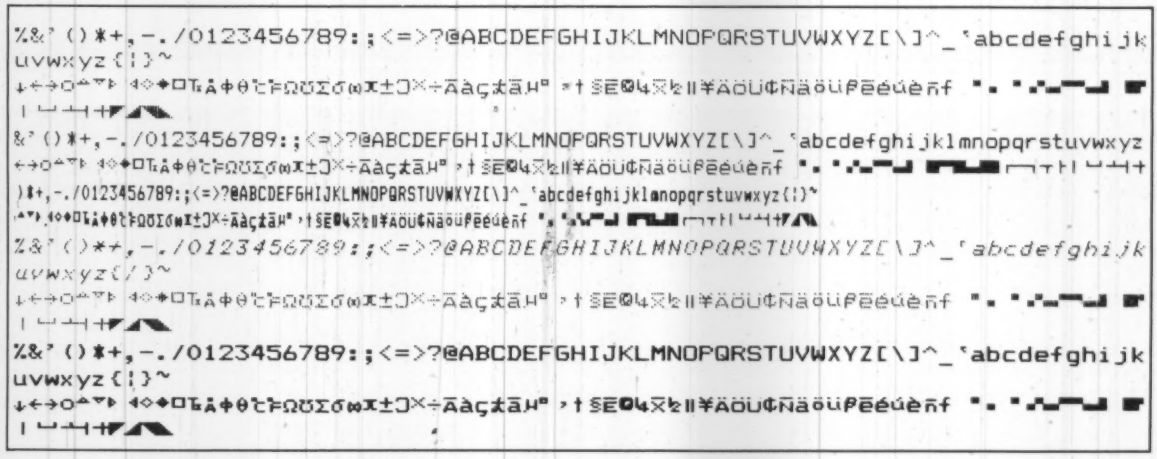


Figure 2.

Answer: Smith-Corona

Question: What company offers a new daisy wheel printer, three dot matrix printers and a combination printer-typewriter, with suggested retail pricing of $395 to $795?

Question: What printer company offers print quality that challenges printers costing hundreds of dollars more?

Question: What printer company offers dual interfaces for all five of its printer models?

Question: What printer company offers removable and adjustable tractor feeds as standard equipment on all of its dot matrix models?

Question: What printer company has a toll-free telephone number to call if you ever have a problem? And an extensive service system, too?

D-300 (TM) dot matrix printer.

L-1000 (TM) daisy wheel printer.

Ultrasonic III Messenger (TM) portable typewriter with optional Messenger Module.

D-100 (TM) dot matrix printer.

D-200 (TM) dot matrix printer.

☐ Please send me more information about Smith-Corona printers; I am interested in in-home use.

☐ Please send me more information about Smith-Corona printers for office use.

Name_____

Company Name_____

Business Address_____

City_____ State_____ Zip_____

Type of Business_____

Send to: Jerry Diener, V.P. Sales, Smith-Corona
65 Locust Avenue
New Canaan, Connecticut 06840

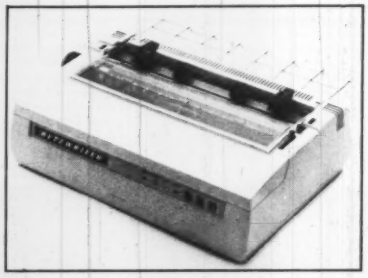
SMITH-CORONA CC6

Print About Printers, continued...

Model 900 daisywheel printer.

Judging from the fact that the manual packed with the Bytewriter Model 900 explicitly calls the machine the Olympia Electronic Compact RO, it is probably fair to assume that the two machines are one and the same.

However, a flyer accompanying the manual takes pains to underscore that Bytewriter markets the Model 900 independently of Olympia and that all "references to Olympia International or Electronic Compact RO which appear in the instruction manual or other places should be disregarded." A Bytewriter nameplate is attached to this flyer, so that the user can stick it on the printer himself.



Bytewriter Model 900.

Why the confusion? Well when you buy the Model 900 from Bytewriter, you are not just buying an Olympia printer. You are also buying a 30-month warranty covering *everything* outside of daisywheels and ribbons. Hence the model number: a 900 day warranty.

Daisywheel printers have more moving parts than dot matrix printers, and service requirements remain a major purchase consideration. For that reason I have always hesitated to recommend low-cost daisywheel machines as quickly as I have matrix machines. The Model 900 is a relatively low-cost machine,

The Model 900 is a relatively low-cost machine, with an iron-clad guarantee for 2½ years.

with an iron-clad guarantee for 2½ years. You are not likely to find another offer like this for a $650 machine.

The Model 900 uses a 100-character plastic print wheel, with six type styles available. It is 10, 12, and 15 pitch adjustable, and accepts cut sheets or pin feed paper. The Model 900 is one of the few low-priced daisywheel machines to offer sprocket feed as a standard feature. Sprocket width is adjustable to 2¼". The platen width is 13".

Print speed reaches a maximum of 14 cps at 15 pitch with a linefeed speed of 100 MS—not very fast, but average for a printer of this category. As with the Delta-10, serial and parallel interfaces are standard. Applause applause.

The Bytewriter 900 is quite noisy during operation, but doesn't create anything near the din of the SCM TP-II. Though it comes in at about 64 decibels, you can live with it. It sounds neither raspy nor "rat-ta-tat."

The print quality of the unit is impeccable—as we have more or less come to expect from daisywheel printers. Print wheel life is estimated at 6 million characters. The multistrike nylon typewriter cartridge ribbon is standard—easy to find and even easier to change.

The manual is a bit paltry, and my advice to Bytewriter is to redo it if at all possible. Not only is it disconcerting to have to "disregard" all references to the Olympia RO, but the coverage is downright perfunctory in places.

But this is a minor bone to pick. The Bytewriter 900 is a good machine, with an excellent warranty.

Daisywriter Sheet Feeder

Way back in March of 1983, we gave a high rating to the Daisywriter 2000, a daisywheel printer with a print speed of 20 cps.

"We like nearly everything about the Daisywriter," we said at the time, "from its sturdy construction to its very complete documentation... The features available in the Daisywriter would have cost well over $2000 only about a year ago. They are well worth the (then $1400) cost..."

Well we still like the Daisywriter, and at a list price reduction to $1100, down $300 list since the evaluation, we like it even more. And now, a cut sheet feeder for the Daisywriter has been made available from Computers International (LQ Corporation).

The Daisywriter cut-sheet feeder is easy to install and works like a charm. Fill it with rag bond, letterhead, or plain paper, up to 200 cut sheets at a time. Or handle envelopes and special labels.

The feeder gears off the platen advance

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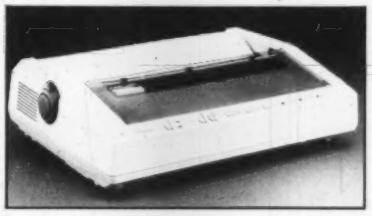
on the Daisywriter and seats firmly into place with a reassuring click. The drive to pressure rollers up above is supplied by linefeeds, and cut-sheets are fed into the printer one at a time. Paper registration is perfect every time.

There isn't a heck of a lot more we can say about the product by way of review, except that it works and it works quite well. If you own a Daisywriter and use it to send out letterhead correspondence or create original documents, the Daisywriter cut-sheet feeder merits consideration. The feeder lists for $595.

NEC Spinwriter 2050

The final machine on this month's review roster is the NEC 2050 Spinwriter. The Spinwriter is unique in that it uses a specially-designed "print thimble" to create fully-formed, letter quality print.

Another truly unique aspect of the NEC 2000 series is its modular interface approach. Open a special door on the back of the machine and the specific interface plugs right in or out. We received a 2050 with plug-compatible module for the IBM. Changing computers? Simply trade interface modules, and your Spinwriter will be ready to work with it. Modules are currently available for 25 different machines.



NEC 2050.

Print speed on the NEC machine reaches a maximum of 23 cps, which is not too bad for a fully-formed character printer. The 2050 also supports 10, 12, and 15 cpi, with a platen width of 16 inches. This makes for a total of 203 possible columns at 15 cpi. Thimble character sets can contain up to 128 characters—dozens more than typical daisywheels can handle. The self-test sample is reproduced here as Figure 3.

The model we received was accompanied by manual pages designed to slip right into the IBM documentation binder. Obviously NEC has given much thought to making printer installation as painless as possible for the uninitiated customer.

Installing the print thimble and cartridge ribbon is simple. Hook up your printer cable, and you're ready for action.

If you try to operate the printer with the plexiglass cover in the up position, you get an illuminated error lamp on the front panel—a nice feature, once you get it into your head that you can't run the printer unless the cover is down.

Form length and character pitch are easily selectable from dials on the front of the machine.

The NEC 2050 lists for $1225, and at that price, other options may beckon strongly. I would have reservations about paying over $1000 for any 23 cps machine. For that price, you can pick up a matrix printer with a very respectable letter quality mode. Still, it is an extremely well-designed printer, geared literally for heavy use. NEC reports a mean time between failures of 40 million characters.

Passport Printer "Emulator"

The Passport Printer Emulator is an interesting device designed to assist the IBM PC and PC work-alike owner by preventing potential time and data loss. When selected for "print bypass" operation, the Passport appears as a standard printer device. As a result, inadvertent depression of the "PrtSc" key, or any other means of invoking printer operations, will prevent the keyboard from becoming locked up or forcing the user to reboot. No physical printer mechanism or printer cable is required to use this mode.

When selected for print "pass-through" operation, the Passport allows normal print operations. The user can then quickly abort an ongoing print operation by reselecting the bypass mode. Unnecessary print operations can be terminated whenever desired.

Passport Printer Emulator.

The product lists for $29.95—a bargain to prevent headaches from hanging PCs.

Mailbag

William Cohen, of Metairie, LA, wrote in with the following:

* * *

After reading your rave review of the Mannesmann-Tally 160L printer in the June 1983 issue, as well as reviews in other magazines, I bought one. It was soon evident that the printer would not

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THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 123 456 7890 +-X
THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 123 456 7890 +-X
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THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG 123 456 7890 +-X
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Figure 3.

Looks like a Ferrari. Drives like a Rolls. Parks like a Beetle.

Ask your computer dealer to take the cover off a world-class disk drive.

The all new, 1984 Indus GT.™

The most advanced, most handsome disk drive in the world.

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The Indus GT is only 2.65" high. But under its front-loading front end is slimline engineering with a distinctive European-Gran flair.

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And each GT comes with the exclusive *GT DrivingSystem*™ of software programs.* World-class word processing is a breeze with the *GT Estate WordProcessor.*™ And your dealer will describe the two additional programs that allow GT owners to accelerate their computer driving skills. *Included as standard equipment.

Also, the 1984 Indus GT is covered with the *GT PortaCase.*™ A stylish case that conveniently doubles as a 80-disk storage file.

Parks like a Beetle.

The GT's small, sleek, condensed size makes it easy to park.

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Print About Printers, continued...

print superscripts and subscripts properly, though these are advertised features. My children need them for term papers, and I need them in work.

If you are printing in the single space mode, the printer will skip one and one-half spaces between lines each time there is a superscript or subscript on that line. This produces uneven and poor-looking text. In addition, my word processing program is unaware of any extra added lines, and therefore no longer correctly recognizes the bottom margin of the page being printed or the top margin of the next page. An embedded command to start a new page does not serve to correct the problem. These defects make the use of superscripts and subscripts impractical.

I called the company and was told that the printer was not malfunctioning but performing as designed by the Mannesmann engineers. Pointing out that their design was not performing satisfactorily merely brought the reply that they have received few complaints; therefore the company saw no need to modify the design.

I recommend that if you are thinking of purchasing a Mannesmann-Tally 160L printer, personally make certain that it performs all the functions you will need—before buying.

* * *

Thanks for writing in, William, and I'm sorry to hear that the purchase of an MT160L has been a disappointment to you. I remain convinced that the machine is a fine one.

I'm sure it will be of small solace to you, but many printers handle super- and subscripts in exactly that same way to circumvent overstrike problems on a previous or following line.

I'm only guessing, but I think a major reason for this seeming kluge is that term papers, and even business reports, are almost always *double-spaced.* At least they were when I was in school, and when I wrote reports as a college administrator. In the double-space mode, the problem is negligible, even on machines that *still* add that extra space.

I know that is not an answer for you—you want super- and subscripts in single-spaced text. I agree that the examples you showed in your letter looked less than desirable. If I had come across the problem during my initial evaluation, I would have made it a nit-pick complaint. And I couldn't agree more with your conclusion—in fact I would extend the advice to all printers and printer buyers: *make sure a machine does everything you want it before you buy.* If you want single-spaced super- and subscripts, check them out in a showroom to see if they are up to snuff.

I don't know how long it took you to discover the problem or whether you bought your unit from a dealer or through the mail. If you bought it through a dealer and discovered the problem in two weeks or so, you should have been able to return it. Sounds to me as if you bought it through the mail, however.

Make sure a machine does everything you want it to before you buy.

My advice to one and all about mail order purchase is only to go that route only if and when you are *absolutely convinced* that you know what you want.

Support is the trade-off for discount prices, and as you know, it is sometimes worth a little extra money to gain a sympathetic ear—and perhaps the chance to unmake an otherwise costly mistake. There is a lesson to be learned here, and I thank you, Mr. Cohen, for making us aware of it.

Well then. That's about it for this installment of Dear Gabby. Until we meet again, keep your form length set for action. Catch you next month.

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(212) 986-6770

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Ithaca, NY 14850
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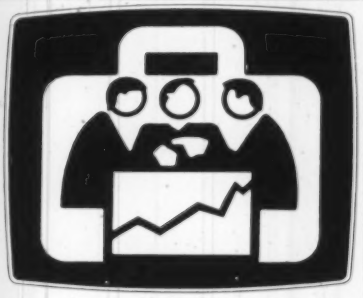


Let's Talk Business

Dale Blanchard

At the end of last month's column I said there was one more story I wanted to tell about how the addition of a computer could damage the profitability of a business. Also, since I didn't get to the concept of the computer as a tool, I said I would try to work that in. And then I wanted to talk about some traps to be avoided when you add word processing to your office. I also made my continuing promise that if I had the space I would try to look at some word processing programs.

The Efficiency Trap

Let's give it another try from the top. First, the story about how a computer could damage the profitability of a business:

About a year ago I was invited to Los Angeles to address a group of vocational counselors about how computers could fit into their businesses. The meeting was held at a large hotel, and before we started, a group of us was sitting in the lounge. One woman who had spent the last five years working for someone else had just announced that she was forming her own company. "And the first thing I'm going to get is a computer," she said.

The rest of us nodded approvingly.

"And you know what I'm going to use it for?" she asked. "Labor markets."

In the system in which she worked, insurance companies would refer injured parties to her and she would develop a plan of action for finding a way to work that person back into the labor market. For her plan to be approved by the state agency she had to do a labor market survey showing that there were jobs in the occupation she had chosen for the injured person and how much those jobs paid. "I would love to be able to push a few keys and in ten minutes have a completed survey."

"How long is it taking you to do them now?" I asked.

"On the average, about four hours," she replied. "And another hour to write the report."

"And you charge $60 an hour?"

"That's right."

"So," I figured, "that's five hours at $60 an hour, or $300."

She nodded.

"How many of those do you do each month?"

"About five."

"That's about $1500."

"Yes," she agreed.

"And how much could you charge if you did them in ten minutes?"

She thought for a minute. "About two tenths of an hour plus an hour for report writing."

"Let's see." I pulled out my pocket calculator. "That's 1.2 hours at $60 an hour—$72."

She nodded a little uncertainly.

"The way you are doing it now, you generate $1500 a month on labor markets. If you were charging only $72 each, you would be generating only $360. Can you increase your business enough to make up the difference?"

"I see what you mean," she said. She looked absolutely crestfallen. "But I hate labor markets."

"Then here's an idea," I said. "First, figure out if you really can do labor market surveys on a computer. If you decide you can, lay the foundation with your customers. Tell them you are going to charge a flat fee for labor markets, say, $250. If everyone else is charging $300, that should encourage your customers to send you more business. If it turns out that you can do them in ten minutes, you will make an astounding profit."

The point of this story is that the woman I was talking to was about to fall into a trap that people who charge by the hour must be careful to avoid: becoming too efficient. Counselors, attorneys, accountants, and engineers are all vulnerable to that trap.

The Computer as a Tool

Very often when I see people contemplating a computer for their business they see it as:

with flashing lights and a fanfare of trumpets. I think that is a serious mistake. A computer should be thought of as a simple tool, something to help you in your business, not something around which to build your business.

Think of a computer the same way you would think of a company car. If you are buying a company car, there are several ways you can go, but one of the most important functions of that car is to provide transportation. In that light, many cars you could buy would be completely satisfactory.

After you have satisfied yourself with

the ability of the potential car to provide transportation, you can start to look at other aspects. What kind of image does it project. Is that important? If you are choosing between two cars with significantly different prices, what will you get for the extra money? Those are standard business decisions. You should apply the same principles to choosing a computer.

I remember a few years ago, when I was in my woodworking phase, I wanted a Shopmaster. Remember the ads in the back of *Mechanics Illustrated* and *Popular Mechanics*? The Shopmaster was a magical machine that could do everything. It was a lathe, a table saw, a radial arm saw, a drill, and probably many other things as well—a truly magic machine. I hungered for one. Fortunately, they were expensive. I already had a table saw, and while a radial arm saw would have been nice once in a while, I really didn't need one. The kind of woodworking I was doing didn't require a lathe, and I was able to make do with my power hand drill. I really didn't need a Shopmaster.

A computer is much like a Shopmaster; it will do almost everything. More expensive computers will often do more than less expensive ones. You must decide what you want your computer to do and then make some choices. If all you want to do is word processing, there probably is no reason to buy an expensive computer with 20Mb of storage.

It occurs to me that I am using the term "computer" rather loosely. Much of what I am saying applies to the computer itself, the terminal, the keyboard, the disk drives, and the circuit boards which hold the central processing unit, the memory, etc. What I am saying applies equally to computer programs (software). It might also apply very well to printers and other peripherals which attach to your computer.

For example, let's say you are considering buying a computer to do word processing and nothing else. First, you don't need a very expensive one. You might even get by with only one disk drive. When it comes to choosing a word processing program, you must decide what kind of word processing you plan to do. If you are going to do nothing but write individual letters to people, a very simple program will do. If you will be writing technical or scholarly papers in which you need to put footnotes, you need considerably more. If you want to send original, but similar, letters to people, you need a program with a list-merge capability.

When choosing a printer, you again need to analyze your application. If you will be sending hundreds of the same version of a letter, you will want as fast a printer as you can afford. Do you want letter quality (looks like it was typed on an IBM Selectric), or will dot matrix do? Again, what kind of image do you want to project? I read a very interesting article once by a person who was setting up a computer service of some kind. Although he had a very good high quality, letter quality printer, he chose to send all his correspondence in dot matrix. He was trying to convey that he had a computer, and he didn't want anyone to miss it.

What I am trying to say here is that you need to think about what you want your computer to do. What do I need this tool for? How can I best apply this tool to my business? How good must this tool be? A carpenter needs a better hammer than does a weekend hacker. Which brings me to two final pieces of advice: **Don't skimp on disk drive storage** and **get the fastest printer you can afford**.

When you are choosing a computer, get the highest capacity disk drives you can afford. There is nothing more frustrating than not being able to do something because there isn't room on the disk. Also, when you first get a computer, everything seems instantaneous. That usually lasts about two weeks. I am at the point now that any wait longer than ten seconds seems interminable. Slow printers can be a source of considerable frustration to the frequent user.

Before we leave the subject of tools, let me tell one quick story. Last month I told you about a program called *Leads* by Datamotion Associates, 795 Pine St. #42, San Francisco, CA 94108. Among other things *Leads* will find a name on a mailing list almost instantly. A few months ago I walked into a law office which uses that program to keep its client list. When I walked in, the computer printer was busily spitting out names and addresses onto Rolodex cards.

"But I thought you were computerized," I said to the attorney I had come to see.

He looked at me for quite a while as if trying to decide if I were serious. He finally decided I was. "Do you know how long it takes a secretary to switch from one program to another?"

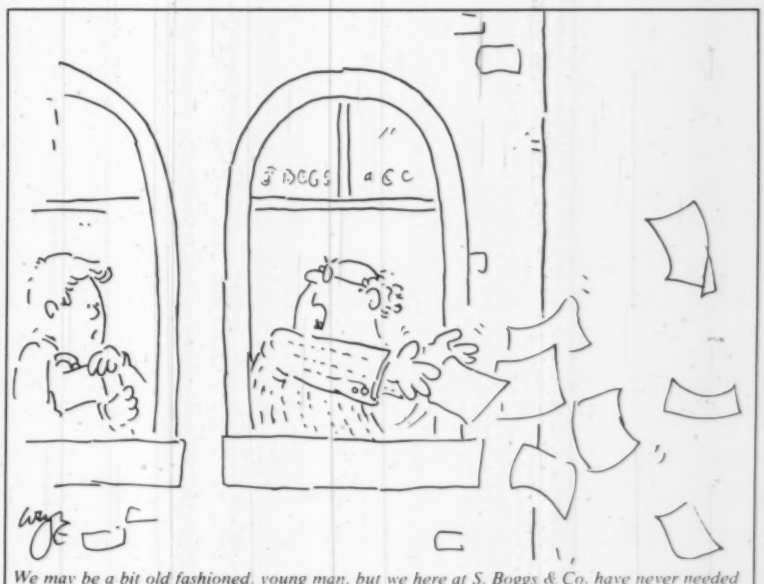
"Forty-five seconds to a minute," I guessed.

"And how long does it take to find a name on a Rolodex card?"

I saw his point. "Probably no more than ten seconds," I replied. And that is the essence of using the computer as a tool. You use a computer when it makes sense to use it, just as you use a hammer when it makes sense to use a hammer. This office was using the computer to do what it was best at, updating and alphabetizing the mailing list. Once that was done, it was much faster to find the name on the Rolodex card.

Next Month

I see that I've done it again; run out of space before getting to discuss some specific word processing programs. It is probably just as well, because one of the main ones I want to talk about hasn't arrived yet. Next month I promise to discuss some traps to watch out for as you adopt word processing. Finally, my ongoing promise: I will discuss some specific word processing programs.



We may be a bit old fashioned, young man, but we here at S. Boggs & Co. have never needed computers to cut down our paperwork!

Apple Cart

Steve Arrants

Much to do this month! PEEKing and POKEing in Pascal, some DOS answers, and an assortment of new products. But before we begin, let's take a look at the almanac.

On the evening of June 5, 1833, Ada Lovelace and Charles Babbage first met. Babbage, inventor of the Analytical Engine, was one of the early pioneers in computer science. And Ada, of course, is remembered for her ideas on what exactly an Analytical Engine should do. Apple shipped its first Apple II in 1977. Blaise Pascal was born on June 19, 1623 and Atari was founded by Nolan Bushnell on June 29, 1977.

Printer Utilities

Apple, sadly, is famous for not supporting the tricks and abilities of their hardware via software. It was left to Peter Joselow to create DoubleStuff to show us what double hi-resolution graphics could be. The same thing happened with the Apple Dot Matrix Printer. The DMP allows downloading of alternate character sets, but selecting this option gives you a FUNCTION NOT AVAILABLE message. Enter the third party developers who have exploited Apple's mistakes.

Apple Dot Matrix Printer Utilities is what Apple *should* have included with the DMP. The programs in this package let you edit characters, set printer specifications, and convert high-resolution fonts from other programs to DMP format.

The character editor is simple to use. Proportional or fixed-width characters are edited on a text display of about one-fourth screen size. The remainder of the screen displays the standard character, the type of character set (English Bold, Quadrata Bold, etc.), available commands, and the ASCII code for that character.

The cursor is controlled from the keyboard. You can select an M, J, I, K diamond, left/right arrows and A and Z keys, or the cursor control keys if you are using an Apple IIe. The spacebar turns the dots on or off. A nice feature is that at any time during editing, you can dump your work to the printer.

The printer setup lets you specify which font is default, line spacing, character width, page length, and other information. After selecting the specifications, one key downloads these to the DMP. The setting remains in effect after you boot another disk, because the settings are in the printer, not the computer RAM.

The font converter is useful if you have a library of fonts created with other software, such as *Fontrix*. Be warned, though. A few large fonts can't be converted to DMP format.

If you bought a DMP on the strength of its ability to use different characters, you were probably disappointed. *Apple Dot Matrix Utilities* will let you make full use of the DMP capabilities.

CIRCLE 437 ON READER SERVICE CARD

SOFTWARE PROFILE

Name: Apple Dot Matrix Printer Utilities

Type: Printer utility

System: 64K Apple, Apple DMP, Apple Parallel Interface Card or Grappler+

Format: Disk

Language: Applesoft

Summary: Invaluable to DMP owners.

Price: $50

Manufacturer:
Vilberg Bros. Computing
Box 72
Mt. Horab, WI 53572
(608) 274-6433

Basic Tutor

Basic is the computer language most of us started out with. We find it easy enough to use now—after years of writing programs. It might be hard for us to believe, but there are still people who have never had their hands on a computer. What looks easy to us is as baffling as Attic Greek to new users.

Basic Tutor from SuperSoft Inc. is an excellent Basic language teacher. Although most of the program is text, it does include some graphics to illustrate important concepts of Basic. It is well organized, well written, and idiot proof.

After booting the disk, you select the first information level. A short bit of text with examples is displayed on-screen. Merely glancing at an example isn't enough, however; you must participate with *Basic Tutor*. To go to a higher level, you must correctly answer a series of questions. Make too many errors, and the program tells you what information you must review before continuing. Unlike some other educational packages, you can't skip ahead to higher sections. Until your Apple is satisfied with your knowledge, you are

SOFTWARE PROFILE

Name: Basic Tutor

Type: Education

System: Apple II, II+, IIe, IIc

Format: Disk

Language: Applesoft

Summary: A good package for the novice. Easy to use.

Price: $99

Manufacturer:
SuperSoft Inc.
P.O. Box 1628
Champaign, IL 61820
(217) 359-2112

stuck at a low level.

You are allowed to review a section after working through it, but unfortunately, you can't scroll back to a previous page in a section. You must return to the beginning and skim through the pages.

Basic Tutor assumes no prior knowledge of the Apple, Basic, or mathematics. It explains what various symbols mean; how to use variables, functions, and subroutines; and how to structure a program.

The best part of *Basic Tutor* is that it lets you proceed at your own speed, step-by-step, with simple language and instruction. No novice could be intimidated by this program.

Basic Tutor is a bit expensive at $99, but the cost may be justified; until you learn Basic you won't get too far with your Apple. You can play games and use a word processor or a spreadsheet, but the real fun and power of a computer comes through your own programming.

CIRCLE 438 ON READER SERVICE CARD

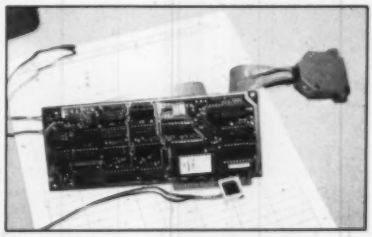
Print-It! Graphics Printer Card

It is easy enough to print text from the Apple. All you need do is issue a PR#1 command to send output to a printer. Depending on your printer, special control codes might have to be issued to print italics, bold, and other fonts. Printing a graphics screen is another matter. Before intelligent printer interfaces became available, you had to load a graphics image into a specific area of RAM and do some lengthy calculations to get a nice, neat image on paper.

Print-It! from Texprint Incorporated provides software independent printer operation for a hard copy of any image—text, graphics, or mixed. It will work with almost any printer. Print-It! will print this screen image at any time during a program and then resume program operation. We used to get screen dumps of software by using an ancient Apple II with a non-Autostart ROM. But with the advent of more sophisticated protection schemes, and the death of that venerable Apple, we have come to rely upon photographs of our screens. Now we can use Print-It! The program seems to bypass the protection schemes and produces the screen image on paper everytime. Note that this is *not* a pirate card. You can't copy a protected disk. You *can* dump any screen image from any program, however.

Print-It! consists of three pieces: the interface card, the button and cable, and a cable to connect Print-It! to your printer. Print-It! can be installed in any free slot. Attach the button to the card and the cable to your printer, and installation is complete.

The button makes Print-It! the easiest of all available printer cards to use. When you are satisfied with a screen image, pressing the button interrupts the program. There are several print options you can select, including text only, graphics, mixed text and graphics, inverse screen, rotated image, Page 1 or Page 2 graphics, and double high-resolution graphics. Each requires a one-letter code to be entered from the keyboard.



When you press RETURN, printing begins. At any time, tapping the spacebar stops printing and returns control to the program.

The manual looks sparse at 18 pages, but then, this is a printer card, not a computer. Print-It! lists for $179, which is less than some other cards that do not offer as much ease of use.

CIRCLE 439 ON READER SERVICE CARD

Talking Transend

Visually impaired computer users can now connect with BBS's, remote hosts, and on-line information services with the help of Transend Corporation and Computer Aids Corporation.

Talking Transend incorporates *Transend 2* software, a Transend modem, and an Echo II speech synthesizer. All information that the program writes to the video display is also spoken through the speech synthesizer.

Computer Aids Corporation develops products which it integrates with Apple computers and sells as turnkey systems to the visually impaired.

Medalist Courseware

Hartley Courseware, Inc., has released six new packages for elementary and secondary social studies. The Medalist series was designed to provide

an enjoyable way for more advanced elementary and jr. high school students to study and learn important facts about various subjects. Subjects in the series include *Medalist Continents, Medalist States, Medalist Black Americans, Medalist Women in History, Medalist Presidents,* and *Medalist Create.* The latter allows the teacher to create new learning courseware in the Medalist format for anything from astronomy to zoo animals.

The Medalist programs, six disk-based programs for the Apple II and IIe, cost $39.95 each.

Glossary Disk for AppleWriter

MinuteWare, publishers of Minute Manuals, quick reference guides to many Apple programs, has released the *Glossary Disk for Apple Writer.* The disk contains separate glossary files of print commands for the Epson series, Gemini 10/10X, Apple DMP/Imagewriter, Prowriter, NEC 8023A, and Okidata printers. Any print code can now be accessed with a single keystroke from within *AppleWriter II* or *AppleWriter IIe.* The disk also includes the alternate character set needed to do super/subcripts on the Apple DMP. An explanation on patching *AppleWriter IIe* to use the NUL code for underlining and superscripting on the Epson MX and Gemini printers is also included. Price is $14.95.

PEEKing and POKEing in Pascal

Although Pascal has been touted as the computer language that outperforms Basic, I find it lacks some features that Basic programmers take for granted. For example, the PEEK and POKE commands used in Basic are not really avail-

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APPLE CAT II.....$279.00
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CIRCLE 142 ON READER SERVICE CARD

able in Pascal. There are some "byte-oriented built-ins" in Pascal such as MOVELEFT and MOVERIGHT which emulate PEEK and POKE, yet they do not perform exactly as the Basic commands do.

It is not too difficult to write Pascal routines that PEEK and POKE. One method is to write a set of simple machine code routines and call them in as external procedures. Since using the Pascal Assembler and Linker are not my strong points, and since Pascal is supposed to be an easy programming language, I turned to Pascal itself.

An obvious method is to create variables that can be used for more than one purpose. For our purposes, this will be something that will be either an integer or the address of an absolute location in memory.

The Pascal declaration we can use will look like this:

```
ppd:record
        case b:boolean of true:
        (pointer: ^ byte);
        false: (address:integer)
    end;
```

The variable is made up of two parts. The first is Boolean, which can have the values true or false. The second can be one of two different types of object. When the Boolean part (ppd:b) is true, the information contained in the second part is treated as a pointer to a byte. When the Boolean part is false, the information is treated as an integer.

To PEEK at a location then, you need only two lines of Pascal to define a suitable function:

```
ppd.value:=addressyou
wanttoPEEKat;
peek:=ppd.pointer ^(*the thing
being pointed at*)
```

But there is still one more Pascal problem we need to deal with. Pointers in Pascal tend to point at words (any two consecutive bytes). Even if you define a byte as a number from 0 to 255, when Pascal points at it, it will point at a number between -32768 and 32767.

It is easy enough to get around this. All we need to do is use a technique known as packing, as Pascal can even point to the exact bit when it is pointing at a packed item. The declaration becomes:

```
byte=packed array [0..0] of 0..255
```

that is, an array of one entry, which is a number between 0 and 255.

The code in Listing 1 is written in the format of a Unit, so if you copy it exactly, compile it, and use LIBRARY.CODE to link it into your SYSTEM.LIBRARY you will be able to PEEK, POKE, DPEEK, and DPOKE (the last two being two-byte equivalents of PEEK and POKE) in any of your Pascal programs by putting in the USES PEEKLIB in the usual place.

If you do not want to make a library unit, you will need to copy the TYPE declaration from Listing 2 into your program along with whichever functions/procedures you want.

Once you can POKE into Pascal, there are many useful things you can do. It is possible to tell the system to forget where it booted from and to look somewhere else for the boot disk. If you use a RAMcard as a boot disk, for example, you can cut compiling time by almost 60 percent.

A simple example of a good use is shown below. It is a short routine that sets an IDS printer to 132 characters per line. A similar program can be written for Epson, Okidata, and most other printers.

```
program ids;
uses peeklib;
var
    f:file of char;
begin
    poke (1668,132)
    rewrite(f, 'printer:');
    writeln(f,chr(15));
    close(f)
end.
```

With the Pascal operating manual at your side, you can find more interesting things to do with PEEKs and POKEs. Be careful, however. It is possible to wipe out every disk in the system with one careless POKE. Whenever experimenting with POKEs, use a backup disk that won't be missed if something goes wrong.

DOS Responses

Letters are still coming in with your answers to my question about an unusual feature of DOS. When you issue CATALOG via a CALL 42350 with the drive door open, DOS answers ROGRAM NOT AVAILABLE (note the missing P) instead of the expected I/O ERROR. Some readers not only answered the question, but provided other interesting information about DOS.

Jay Nabonne (who forgot to include a return address) gave the best explanation. As he explains it, DOS is not disconnected when the drive door is left open. DOS uses one memory location ($AA5C) for both an error code and the last character output. When an error message is printed, its number is stored in $AA5C. A RETURN BELL RETURN is printed. Then the error number is retrieved, compared against the index table, and printed out. If DOS is not disconnected, the RETURN printed before the error message places a RETURN ($8D) in $AA5C. This is then used as the error message. Since there is no error message for $8D, it points beyond the index table into memory. It just so happens that the number it points to in memory is the first R in PROGRAM NOT AVAILABLE. So DOS, not being too smart, prints the error message from there.

Thanks, Jay. And thanks to all the other readers who wrote in with explanations. Now another question. Have you discovered any ProDOS tricks, errors, or oddities? Send them in!

That's all for June. Questions and comments should be sent to me here at the magazine, to CompuServe 76703,654, or MCI Mail address SARRANTS. END

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Listing 1.

```
(*****************************************)
(*                                       *)
(*  This routine will PACK a byte        *)
(*                                       *)
(*****************************************)
unit peek1b;
intrinsic code 25;

interface
     type
     code=0..255;
     byte=packed array[0..0] of code
     dpeekdpokedata=record
          case b:boolean of
               true:pointer:^integer);
               false: (address:integer)
          end;
     peekpokedata=record
          case b:boolean of
               true:(pointer=^byte);
               false:(address:integer)
          end;
```

Listing 2.

```
(*****************************************)
(*                                       *)
(*      This routine, when linked,       *)
(*      will let you PEEK and POKE       *)
(*      at a specific memory location.   *)
(*                                       *)
(*****************************************)
function peek(address:integer):code;
proceedure poke(address:integer;value;code);
function dpeek(address:integer):integer;
proceedure dpoke(address,value:integer);

implementation
(************)
     function peek;
     var
          ppd:peekpokedata;
     begin
          ppd.address:=address;
          peek:=ppd.pointer^[0]
     end;

     proceedure poke;
     var
          ppd:peekpokedata;
     begin
          ppd.address:=address;
          ppd.pointer^[0]:=value
     end;

     proceedure dpoke;
     var
          ddd:dpeekdpokedata;
     begin
          ddd.address:=address;
          ddd.pointer^:=value
     end;

     function dpeek;
     var
          ddd.dpeekdpokedata;
     begin
          ddd.address:=address;
          dpeek:=ddd.pointer^
     end;

     begin
     end.
```


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CIRCLE 137 ON READER SERVICE CARD

A Lesson on X, Y Coordinates

Logo Type

James Muller

One of the more confusing features of Logo for many young users is learning to use X and Y coordinates. Indeed, it can be even more confusing for adults. Trying to get novice programmers to visualize the invisible axis that divides the screen into four quadrants can present real stumbling blocks to progress with Logo. But making a game out of it can make the concepts a bit more fun to work with, if not easier to grasp.

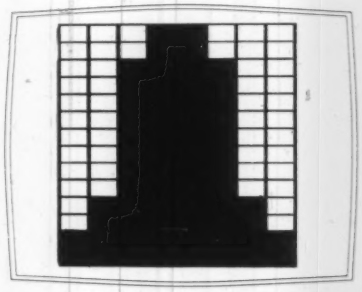
The coordinate game involves putting a target on the screen at a random location, and then guessing the X and Y coordinates of the target. The rules can make hitting the target very easy or require the players to guess the exact location. It's a bit more fun when a choice of different skill levels is designed right into the game.

Zap the Turtle is written in Atari Logo, though it can be easily translated to Apple Logo or other similiar versions of the language. Atari Logo offers four turtles, each of which can change its shape. In this game, one turtle fires a missile at another turtle on the screen.

Turtle #1 is changed into a missile shape by using the EDSH command. This puts an 8 x 16 grid on the screen which can then be defined using the control keys and the spacebar.

Entering the word ZAP brings the introduction to the game on the screen. The P procedure then sets the level of difficulty: 5 is the easiest level and 0 is the hardest. READNUMBER takes your input and assigns it to the variable SKILL. We will explore this further in a moment, but first let's set up the screen.

Control of the game passes to the T procedure which then places the target turtle on the screen at a random location. The variables ANS1 and ANS2 become



the X and Y coordinate positions. Then control passes on to the GAME procedure.

In this procedure, the player guesses the location of the target turtle by entering variables ANS3 and ANS4. These are then compared with the coordinates of the target. This is where the SKILL level comes into play. If the value of SKILL is 5, the player's guess can be off by plus or minus 5. If the value of SKILL is 0, the player must guess the exact coordinates.

When the player enters a guess that is off by more than the value of SKILL, control of the game is passed back to the beginning of the GAME procedure. If within the limits set by the value of SKILL, control passes to the CHEERS procedure. Then the process starts all over again.

Those using Atari Logo can use the collision detection in that version of the language to test if their guess is on target or not. Those with Apple Logo or similiar versions need only make some minor changes to play the game. Rather than use a turtle as the target, the turtle draws a small circle on the screen. The center of the circle will be the exact coordinates of the target.

These are the changes required to run the game in Apple Logo:

```
TO T :SKILL
CLEARSCREEN
CLEARTEXT
MAKE "ANS1 (RANDOM 135) -
(RANDOM 135)
MAKE "ANS2 (RANDOM 110) -
(RANDOM 70)
PENUP
SETPOS LIST : ANS1 :ANS2
CIRCLE
GAME :SKILL
END

TO CIRCLE
LEFT 90 FORWARD 5 RIGHT 90
PENDOWN
REPEAT 36 (FORWARD 1 RIGHT
10)
PENUP
HOME
PENDOWN
END
```

In the game procedure, change the following lines: 1) Change the first line to read, PENREVERSE CLEARSCREEN; 2) Line 7 which starts, ASK 1, should read: SETPOS LIST :ANS3 :ANS4.

When young people start to use X and Y coordinates, it helps to draw the quadrants on the screen using erasable markers. You can even add marks on the grid to help them estimate the distances involved.

Off-Computer Activities

Another activity which helps children become familiar with coordinates is to use graph paper. Let the children draw

Listing for Zap the Turtle in Atari Logo.

```
TO P
TS CT SETCURSOR [0 8]
PRINT [Select your level of difficulty.]
SETCURSOR [0 10]
PRINT [\ \ \ \ 5 = Easiest level.]
PRINT [\ \ \ \ 0 = Hardest level.]
MAKE "SKILL READNUMBER
T :SKILL
END

TO ZAP
CT
SETCURSOR [0 5]
PRINT [Welcome to the game of...]
SETCURSOR [0 7]
PRINT [* * * * * ZAP THE TURTLE * * * * *]
PRINT "
PRINT [One of the Turtles will appear on the]
PRINT [screen. Can you guess the X and Y]
PRINT [coordinates to hit the Turtle?]
PRINT "
WAIT 200
PRINT [Aw, C'mon!] WAIT 50
PRINT "
PRINT [Give it a try!] WAIT 50
PRINT "
PRINT [To play, press 'P and then RETURN.]
PRINT [To change the skill level at any]
PRINT [time, press 'P.]
END

TO T :SKILL
TELL 1
SETSH 1
CS CT PU
TELL [0 1 2 3] HOME
MAKE "ANS1 ( RANDOM 135 ) - ( RANDOM 135 )
MAKE "ANS2 ( RANDOM 115 ) - ( RANDOM 70 )
ASK 2 [PU SETPOS LIST :ANS1 :ANS2]
GAME :SKILL
END

TO FLASH :C
SETBG :C
WAIT 10
MAKE "C :C + 7
IF :C > 70 [SETBG 74 STOP]
FLASH :C
END

TO CHEERS
CT
REPEAT 5 [PRINT [CONGRATULATIONS!]]
FLASH 0
T :SKILL
END

TO GAME :SKILL
TELL [0 1] PX CS
PRINT [Can you hit the target?]
WAIT 80 CT
PRINT [Guess the X coordinate?]
MAKE "ANS3 READNUMBER
PRINT [Guess the Y coordinate?]
MAKE "ANS4 READNUMBER
ASK 1 [SETPOS LIST :ANS3 :ANS4]
WAIT 20
IF OR ( :ANS3 < :ANS1 - :SKILL ) ( :ANS3 > :ANS1 + :SKILL ) [GAME :SKILL]
IF OR ( :ANS4 < :ANS2 - :SKILL ) ( :ANS4 > :ANS2 + :SKILL ) [GAME :SKILL]
CHEERS
END

TO READNUMBER
OUTPUT FIRST RL
END

TO PICK
PRINT [Select your level of difficulty.]
PRINT [\ \ \ \ 5 = Easiest level.]
PRINT [\ \ \ \ 0 = Hardest level.]
MAKE "SKILL READNUMBER
GAME :SKILL
END
```

the screen on the graph paper and then draw different small shapes on the paper just as the turtle does on the screen. If you have the time and space, let children play turtle. Mark the coordinates off on the floor and then have other children tell the turtle to move to different locations to pick up a book, or draw a square on a piece of paper. Making these activities competitive can add some enthusiasm to class or club sessions. Make it a scavenger hunt. Which team can move around the grid in the fewest moves to pick up a list of items?

The pencil, game, and other off-computer activities, have some subtle advantages. Children often have trouble understanding some of the abstract mathematical concepts in Turtle geometry. Using their bodies to *feel* these abstractions helps make those concepts come alive and makes them more understandable. Off-computer activities also help solve the problem of what to do with 25 students, one or two computers, and a 50-minute class period. Establishing "learning centers" where groups can work on the same fundamental concept in different ways helps children discover the variety of ways in which the same concepts can be used.

Next time we will look at some other ways in which Logo can come alive on and off the computer. ■

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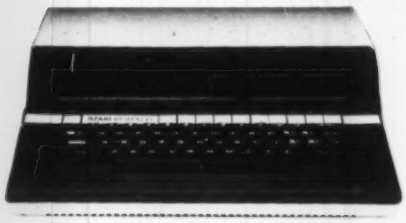


Outpost: Atari

Arthur Leyenberger

The interval between Outposts grows shorter every month. And there is always plenty to talk about. This month the topic is graphics tablets. But before we get to the main feature, here is a short subject of interest.

It is impossible for you to know this by reading the column, but I am using a different word processor this month. In the past LJK's *Letter Perfect* has served me well, and occasionally *Atariwriter* has been called in from the bullpen for special assignments such as proportional printing on my Epson FX-80 printer. I have graduated to the big leagues and am now using *WordStar* by Micropro. "Impossible!" you say. "Don't believe a word of it," I hear? Rest assured that this is not the April Fool's column.

Through the miracle of modern science, or more precisely, through the miracle of SWP, my Atari is now capable of running CP/M software on a Z80 microprocessor. Some of you have already guessed it, I am using an ATR8000. There will be a complete feature review of this marvelous product in an upcoming issue of *Creative*. Rather than give the store away now, I just want to whet your appetite by telling you what this product can do.

Without hesitation, qualification, or any payola changing hands, I can say that the ATR8000 is the most exciting Atari peripheral to appear since the first Atari computer made its debut on the home computing scene.

Why is it so important? Because the ATR8000 combines several peripheral devices into one and is affordable. In its simplest form, it takes the place of the Atari 850 interface, providing a parallel printer port and RS-232 port. Also included in the 16K basic configuration ($350) is a 12K print buffer.

This would be a bargain in itself if that were all there were to the unit. But there is more. Generic disk drives in the $150 to $300 price range can be added to your system. And with the onboard Z80 microprocessor, a 64K upgrade (an additional $200 for memory chips and software) will allow you to run CP/M software and maintain full Atari software compatibility. For the person who finds price to be no obstacle, a fully configured system will boast 256K RAM and MS-DOS (as in IBM PC) compatibility.

If I say much more, there will be no need to publish the full length review, and you will think this is all a commercial. But in closing, I want to dispel a couple of popular myths that I have been as guilty of perpetuating as anyone else. Namely, the CP/M operating system which originally grew up with those early S-100 computers is difficult to use. It isn't.

And much to my surprise (and embarrassed amusement), I found it to be very similar to Atari DOS 2.0S. This is no coincidence, since Bill Wilkinson and company, designers of Atari DOS, had a systems background and were quite familiar with CP/M.

Another myth I would like to debunk is that *WordStar* is difficult to use. Ain't true. Sure, the help information seems to overwhelm the screen, but it can be turned off gradually as you learn the system. As with learning anything new, *WordStar* takes a little time to get used to. Although I have the complete two-pound reference manual, I used only the section on installation and bought myself an inexpensive quick guide. Eventually, I will read the entire manual, including the tutorial sections and will include a review of it as part of the ATR8000 piece.

Graphics, Art and Touch Tablets

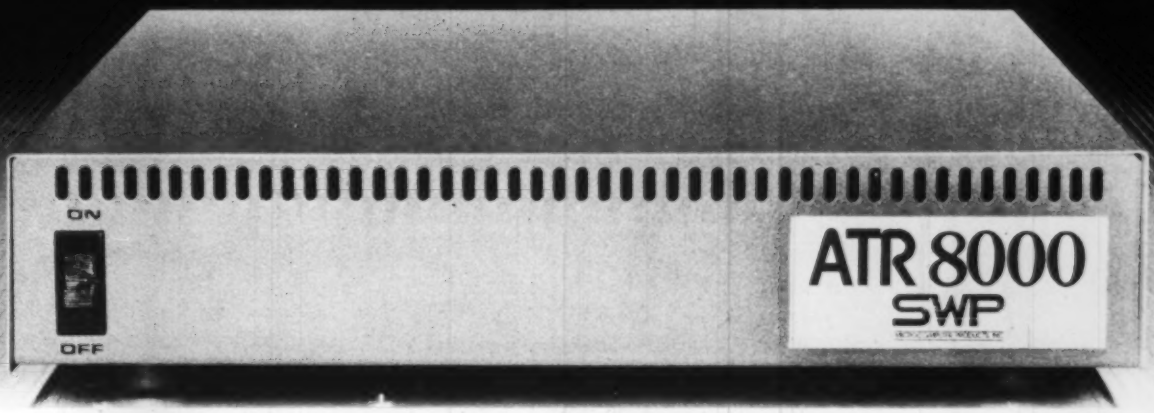
One of the reasons I purchased an Atari computer was for its excellent graphics capability. However, although I have been programming in Basic for many years, I was not ready to invest many hours into developing graphics programs. My first alternative to this time-consuming project was to use a couple of the drawing programs that are available. These included *Paint, Micropainter,* and *Fun with Art*. All of these products required the use of a joystick as a "paintbrush."

I soon became accustomed to using a joystick for drawing and control, but I knew there had to be something better. My main problem was control. I was just not able to get as fine a movement as I wanted. One solution was to use a trackball instead of the joystick. This was clearly an improvement, but the response was rather slow.

Next I tried a light pen—actually a couple of different light pens—and found that approach to be completely unacceptable. I was better off sticking with the joystick. Pen position was critical in order to have the program see my movements. Also, there was something foreign and uncomfortable about drawing with my arm extended toward the screen.

It was at about this time that graphic tablets started to appear. I was able to obtain a KoalaPad, an Atari Touch Tablet, and a Powerpad tablet for review. I am pleased to report that I have at last found the answer to my graphics needs. All three products give you more control than a joystick or a trackball, are more reliable as input devices than a light pen, and are

CP/M and MS-DOS Compatibility For All Atari Computers



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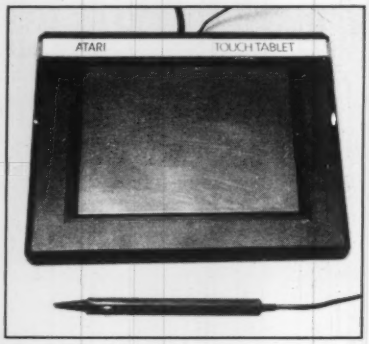
so versatile that new uses for them will continue to be found.

Interestingly enough, the graphics drawing program for which I was searching is almost identical on all three tablets. The tablets differ primarily in size and "feel." I will first describe the physical aspects of these three different yet similar products.

Let's Get Physical

The Atari Graphics Tablet measures 7.5" x 9.5" x 1.25". The drawing surface is horizontally oriented and measures 5" x 6.5". A stylus containing a pushbutton plugs into the back of the tablet, and the



Atari Touch Tablet.

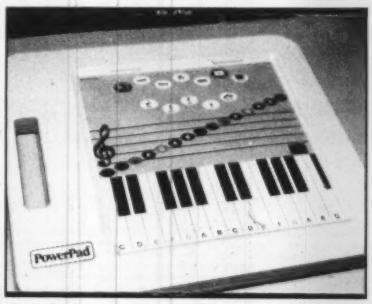
tablet is attached to joystick port 1. Two large pushbuttons, one on each side, are located toward the top of the tablet. A clear, removable piece of plastic allows a piece of paper to be inserted underneath for tracing.

The KoalaPad is slightly smaller than the Atari tablet and measures 8.5" x 6.5" x 2". The square drawing area is 4.25" on each side. The pad has a vertical orientation, and the two large horizontal pushbuttons are located on top. Also, the pad is angled about 30 degrees so that the

Koala Pad from Koala Industries.

back of the tablet is higher than the front. A separate, unattached stylus is used for drawing.

Chalkboard's Powerpad is the largest of the group. The dimensions are 17" x 19" x 1.5". The Powerpad has a 12" square drawing area and is horizontally oriented. A separate, unattached stylus, slightly thicker than that of the Koala, is used. One interesting aspect of the Powerpad is that the cord that plugs into the joystick port on the Atari computer is detachable. One end of the cord has a joystick plug, and the other has a modular telephone



The Powerpad from Chalkboard.

plug. If this modular telephone plug were inserted into a modular wall jack rather than the Tablet, 96 volts would be sent into the delicate innards of your computer when the phone rang. Best keep the Powerpad away from telephones.

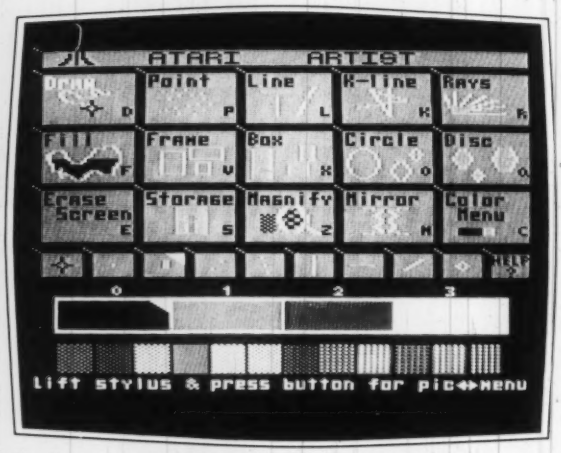
Mylar overlays come with the software and are placed on top of the pad. Some areas are defined as keys, while others may have symbols, shapes, or figures. The Powerpad itself contains an x,y matrix of 120 by 120 wires. Signals from this grid of 14,400 points are digitally sensed, encoded, and read by the computer. One advantage of the Powerpad is that multiple points can be sensed simultaneously. Both the Atari and Koala tablets can only sense one point at a time.

The Software

The graphics drawing program used by the Koala, Atari, and Powerpad tablets is called the *MicroIllustrator*. The Atari version was written by Steven Dompier and Robert Leyland of Island Graphics Corporation. Atari calls it *AtariArtist*. Both the Atari and Powerpad programs are cartridges. The Koala program comes on a disk, but it will soon be available in a cartridge version. However, the programs themselves and the disk files are not compatible with each other.

The *MicroIllustrator* program is very powerful. As an electronic drawing tool it allows you to draw freehand using several different brushes and colors. You can create geometric shapes of all kinds and sizes and change colors of the drawings at any time. There is also a magnify option for detail work, and you can save your masterpieces to disk or tape.

The program is incredibly easy to use. You can begin using it immediately by selecting from among the dozen menu items. The choices are divided into three sections: commands, brush set, and color



Atari's version of the Micro Illustrator: Atari Artist.

"Moonlight" created with the Koala Pad.

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set. For example, with the menu screen displayed, move the stylus to DRAW and press the left button on the tablet. This selects the DRAW option, which allows you to draw freehand on the screen.

Say you want to use a different color? Press the left button once again to bring back the menu and position your stylus over one of the colors on the bottom of the screen. Press the button to choose that color, move back to the DRAW box, and press again. You can now continue your drawing with the new color.

In addition to the pushbuttons on each side of the tablet, the Atari tablet also has a button on the stylus itself. It functions exactly as the tablet buttons do. The Powerpad tablet has, instead of push-buttons, two areas on the tablet itself. One is labeled Menu and the other Pen Down. Pressing these two labels corresponds to the button presses on the Atari and Koala tablets.

Here are some of the other options. LINE draws individual straight lines, K-LINE is similar, but the end point of one line becomes the beginning of another. RAYS makes lines that radiate from one point. BOX and FRAME allow you to make squares and rectangles by specifying two corners. The frame is filled with color with the BOX option. CIRCLE and DISC work the same way. CIRCLE is just the outline, and DISC fills in the circle. Any portion of your drawing may be filled with color by selecting the FILL option, pointing with the stylus, and pressing the button.

The ERASE and STORAGE commands are easy to use and include fail-safe techniques to prevent you from accidentally erasing a drawing or destroying a file. File loading and saving is also a breeze.

One of the more unusual options with this graphics program is the MIRROR mode. This choice lets you create duplicate or reverse images of your stylus movement. You can choose from horizontal, vertical, diagonal, or all (four-way) on the *Atari-Artist*, whereas the Koala and Powerpad programs have only four-way. Some very pleasing effects may be created using these options.

Using the Touch Tablets

All three of these touch tablets are a pleasure to use. The choice is not whether you should buy one, but rather which one. You could not go very wrong choosing any of them. The deciding factor will probably be size (the Powerpad is the largest and probably easiest for young children to use) and future products.

The KoalaPad already has several additional titles that work with the pad. These include a simple music program and several disks of geometric shapes that may be colored much like a coloring book. Koala is just beginning to use overlays with their products. There is also a programmer's package that shows how to use the Koala tablet with your Basic programs. It even includes some Basic routines to get you started.

Listing 1.

```
100 REM CONVERT COMPRESSED FILE TO BINARY FILE BY KOALA TECHNOLOGIES
110 REM MODIFIED BY BRUCE FRUMKER TO SAVE AND TRANSFER COLOR REGISTERS
120 REM NAME -- KOALA2MP
125 REM
127 REM
200 REM PROGRAM STARTS AT 8000
210 GOTO 8000
2000 REM DECODE BYTE COUNT
2010 UNQ=0
2020 GET #1,CNT
2030 IF CNT>=128 THEN UNQ=1:CNT=CNT-128:REM UNIQUE DATA
2040 IF CNT<>0 THEN RETURN
2050 GET #1,CNT:GET #1,IN:CNT=256*CNT+IN:RETURN
5000 REM GET NEXT ADDRESS
5010 AD=AD+OFF:IF AD<MX THEN RETURN
5020 IF ODD=0 THEN ODD=1:AD=AD-7640:RETURN
5030 ODD=0:AD=AD-7719:IF AD<MN+40 THEN RETURN
5040 GOTO 8600
6000 REM VERTICAL COMPRESSION
6010 X=0:MN=28672:AD=MN:MX=36352:OFF=80:ODD=0
6020 REM FOR I=MN TO MX-1:REM FILL MEMORY WITH ZERO
6030 REM POKE I,X
6040 REM NEXT I
6100 REM VERT. COMPRESSION
6110 GOSUB 2000:REM GET COUNT
6120 IF UNQ=0 THEN 6200
6130 FOR I=1 TO CNT:REM UNIQUE DATA
6140 GET #1,X:POKE AD,X
6150 GOSUB 5000:REM GET NEXT ADDRESS
6160 NEXT I
6170 GOTO 6110
6200 GET #1,X:REM REPEATED DATA
6210 FOR I=1 TO CNT
6220 POKE AD,X
6230 GOSUB 5000
6240 NEXT I
6250 GOTO 6110
7000 REM GET DEFAULT FILE NAME
7010 F2$=F1$:X=LEN(F2$)
7020 IF F2$(X-3,X)<>".PIC" THEN 7050
7030 F2$=F2$(1,X-4):? F2$
7040 RETURN
7050 ? "Cannot Make Default File. Re-enter.":?
7060 ? "Enter Output File Name ":INPUT F2$:RETURN
8000 REM INITIALIZATION
8010 DIM F1$(16),F2$(16),IN$(5),COL(4)
8100 REM OPEN FILES
8110 GRAPHICS 0:TRAP 9000
8120 ? "******* CONVERSION PROGRAM *******":? :?
8130 ? "Enter Koala File Name":? "(use D: and .PIC)"
8140 INPUT F1$
8145 IF F1$(1,2)<>"D:" OR F1$(LEN(F1$)-3,LEN(F1$))<>".PIC" THEN 8130
8150 OPEN #1,4,0,F1$
8160 ? :? "Enter New File Name (use D:)":? "(Press Return for Default
     File Name)"
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Outpost: Atari, continued...

```
8170 INPUT F2$:IF LEN(F2$)=0 THEN GOSUB 7000
8180 IF F2$(1,2)<>"D:" THEN 8160
8190 ? :OPEN #2,8,0,F2$
8200 REM START READING HEADER
8210 RESTORE :TRAP 9990
8220 FOR I=1 TO 7
8230 GET #1,IN:READ X
8240 IF IN<>X THEN 9100
8250 NEXT I
8260 GET #1,TYPE:REM READ IN COMPRESSION TYPE
8270 GET #1,IN:REM IGNORE GRAPHICS MODE
8275 FOR I=1 TO 4:GET #1,IN:NEXT I
8280 FOR I=0 TO 4
8285 GET #1,IN:X=INT(IN/16):Y=IN-X*16
8287 COL(I)=IN
8290 ? "Color Register ";I;" contains":? "        Hue ";X;" and
     Luminosity ";Y
8295 NEXT I
8296 FOR I=1 TO 9:GET #1,IN:NEXT I
8300 REM DECOMPRESS DATA FILE
8320 TRAP 9200
8330 IF TYPE=1 THEN 6000:REM VERTICAL COMPRESSION
8400 REM DEAL WITH HORIZONTAL COMPRESSION
8410 GOSUB 2000:REM GET COUNT
8420 IF UNQ=0 THEN 8500:REM REPEATED DATA
8430 FOR I=1 TO CNT
8440 GET #1,X:PUT #2,X
8450 NEXT I
8460 GOTO 8400
8500 GET #1,X
8520 FOR I=1 TO CNT
8530 PUT #2,X
8540 NEXT I
8560 GOTO 8400
8600 REM SAVE FILE
8610 FOR AD=MM TO MX-1:REM VERTICAL COMPRESSION
8620 X=PEEK(AD)
8630 PUT #2,X
8640 NEXT AD
8700 REM PUT IN MICROPAINTER COLORS
8710 PUT #2,COL(4):PUT #2,COL(0):PUT #2,COL(1):PUT #2,COL(2)
8720 REM FINISHED
8730 ? :? :? "Conversion Completed. "
8780 CLOSE #1:CLOSE #2:GOTO 9999
9000 REM FILE OPEN ERROR
9010 ? "File Error - Try Again.":GOTO 9999
9100 REM NOT A PICTURE FILE ERROR
9110 ? "Not a Picture File - Try Again.":GOTO 9999
9200 REM END OF FILE REACHED
9210 IF PEEK(195)<>136 THEN PRINT "Error ";PEEK(195);" at line ";256*PEEK
     (187)+PEEK(186):STOP
9220 IF TYPE=2 THEN 8700:REM HORIZONTAL TYPE
9230 ? "Picture Data May Not Be Complete.":? :GOTO 8600
9900 REM DATA STATEMENTS TO MATCH HEADER
9910 DATA 255,128,201,199,26,0,1
9990 REM ERROR TRAP
9991 ? "Error ";PEEK(195);" at line ";256*PEEK(187)+PEEK(186):STOP
9998 REM RERUN THE PROGRAM
9999 FOR I=1 TO 500:NEXT I:RUN
```

Although it has the smallest drawing area, the KoalaPad was liked by all who used it. Its performance was judged to be second best, but given the available software, price, and ease of use, it appeared to be the all-around favorite.

The Powerpad has the most ambitious collection of ancillary software. These titles include several games and a four-voice music program that uses the multiple sensing aspect of the tablet to play chords. Another advantage of the Powerpad is that it uses overlays. This makes operation of the touch tablet much easier than if input from the keyboard were required.

Although the Powerpad has the most software of all three tablets, I know of several users (including me) who are disappointed with its performance. Specifically, the Powerpad will miss points if you draw too rapidly. With the *Micro-Illustrator* and Leo's *'Lectric Paintbrush* programs, moving the stylus across the pad had to be done very slowly so as not to miss points.

The Atari tablet was clearly the most attractive and the best performer. Zigzags can be made from one end of the tablet to the other, and the software/hardware combination always keeps up. At this time Atari does not have any additional software for their touch tablet. However, there are plans to release some additional programs later this year.

Compatibility

Although all three touch tablets use virtually the same software, the tablets are not interchangeable. This means, for example, that I cannot use the Koala tablet with the *AtariArtist* cartridge. Not only are the programs not interchangeable, the disk picture files created by the programs are not compatible. And to make matters worse, the files are not compatible with other programs like *Color Print* and *Micropainter*. So there is no way to get a screen dump of your beautiful pictures.

But, leave it to an Atari User Group member to figure out that this sorry state of affairs needs attention. Bruce Frumker of the Atari Computer Enthusiasts of Cleveland has sent me some routines to convert KoalaPad files to and from *Micropainter* and *Color Print*. Listing 1 labeled KOALA2MP converts files from Koala to *Micropainter* format. Listing 2 labeled MP2KOALA converts files from *Micropainter* to Koala format. Listing 3, written by Keith Tscherne also of the Cleveland group, converts from *Micropainter* to *Fun With Art* (Epyx) format.

Thanks for the programs Bruce and Keith. Let us hear from the rest of you User Group members.

Also of interest is information provided by Russ Wetmore via Michael Reichmann on loading and saving compatible files

from the KoalaPad. To save "standard" pictures use the following procedure: While your picture (not menu) is displayed using the KoalaPad, press the INSERT key on the Atari, and the picture will be saved on the disk under the name Picture. It will be 62 sectors long so be sure there is enough room on your disk.

To load a "standard" picture go to the drawing screen (it does not matter if it is blank or not) and press the CLEAR key on the keyboard. If there is a file called Picture on your disk in drive 1, it will be loaded. The load and save picture techniques just mentioned do not use the color registers. Therefore, your pictures will have to be adjusted to their original color. The programs to convert to and from the Koala format *do* use these registers so your colors remain intact.

Listing 2.

```
3 REM -CONVERT MICROPAINTER PICTURE TO KOALA FORMAT - BY BRUCE FRUMKER
5 REM -- NAME: MP2KOALA
7 REM
9 REM
10 DATA 255,128,201,199,26,0,1,0,14,0,48,0,192,0,30,0,0,0,155,155,155,155,162
15 DIM IN$(14),OUT$(14),PIC$(7680)
20 TRAP 20:CLOSE #1:? "{CLEAR}MICROPAINTER FILE NAME":? "{use D:} ";:INPUT IN$
25 IF IN$(1,2)<>"D:" THEN 20
30 CLOSE #2:? :? "SAVE AS WHAT KOALA FILENAME":
   ? "{use D: and .PIC}: ";:INPUT OUT$
```

The Creativity Connection

It can be argued that these graphics tablets are nothing more than "electronic coloring books." The proponents of this argument further suggest that a piece of paper and some crayons are equally good. Assuming that a child can be equally creative with either medium, the question must be asked, "is there an advantage to touch tablets?"

My response would be that the very nature of the electronic medium which allows you to draw quickly and see the results of experimenting with colors and shapes, is the advantage. Also, an electronic creation can be manipulated (and even erased) more easily than its paper and crayon counterpart.

With some adult guidance, these graphics tablets and their various programs can be wonderful. Their use is limited only by the user's imagination. I think that they are the best thing to hit the home computer scene in a long time. ■

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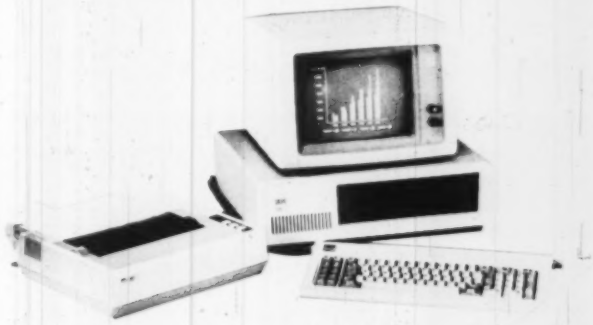
Outpost: Atari, continued...

```
32 IF OUT$(1,2)<>"D:" OR OUT$(LEN(OUT$)-3,LEN(OUT$))<>".PIC" THEN 30
34 IF IN$=OUT$ THEN 20
36 TRAP 40000
40 OPEN #1,4,0,IN$:OPEN #2,8,0,OUT$
45 ? :? :? "  WORKING.....";
50 FOR I=1 TO 7680:GET #1,A:PIC$(I,I)=CHR$(A):NEXT I:REM - GET MICROPAINTER PICTURE AND STORE IN PIC$
55 GET #1,C1:GET #1,C2:GET #1,C3:GET #1,C4:REM -GET MICROPAINTER COLOR DATA
60 FOR I=1 TO 13:READ A:PUT #2,A:NEXT I:REM -WRITE 1st PART OF KOALA HEADER
65 PUT #2,C2:PUT #2,C3:PUT #2,C4:PUT #2,12:PUT #2,C1:REM -INSERT COLOR DATA INTO HEADER
70 FOR I=19 TO 27:READ A:PUT #2,A:NEXT I:REM -  COMPLETE THE WRITING OF THE KOALA HEADER
75 FOR I=1 TO 7680:PUT #2,ASC(PIC$(I,I)):NEXT I:REM -WRITE THE PICTURE DATA
80 ? :? :? "Whew....I'm finished now."
90 CLOSE #1:CLOSE #2:END
```

Listing 3.

```
0 REM MICROPAINTER TO FUN WITH ART CONVERSION PROGRAM BY KEITH TSCHERNE
1 REM NAME -- MP2FWA
2 REM
3 GOSUB 500
4 DIM NAMENEW$(15),NAMEOLD$(15):TRAP 1000
5 ? :? :? :? "ENTER MICROPAINTER FILENAME":? "(EX. D:PICNAME.MCP ->)";:INPUT NAMEOLD$
6 ? :? :? :? "ENTER NEW FUN WITH ART FILENAME":? "(EX. D:PICNAME.FWA ->)";:INPUT NAMENEW$
7 TRAP 1000
10 GRAPHICS 24:GOSUB 100
12 CLOSE #1:GOSUB 300
15 GOSUB 200
16 CLOSE #1
20 GRAPHICS 0:POKE 710,0:? "ALL DONE....":? :? "ANOTHER?(Y/N)":OPEN #1,4,0,"K:":GET #1,A:IF CHR$(A)="Y" THEN RUN
30 IF CHR$(A)="N" THEN ? "%I AM":END
40 GOTO 20
100 OPEN #1,4,0,NAMEOLD$
120 GOSUB 30000
130 RETURN
200 OPEN #1,9,0,NAMENEW$
210 POKE 850,11:POKE 852,PEEK(88):POKE 853,PEEK(89):POKE 856,0:POKE 857,30
220 X=USR(ADR("hhh▒LV@"),16)
230 RETURN
300 OPEN #1,8,0,NAMENEW$
310 PUT #1,160:PUT #1,192:CLOSE #1:RETURN
500 GRAPHICS 2:POKE 710,0:? #6;"    MICROPAINTER":? #6:? #6;"          TO"
510 ? #6:? #6;"    FUN WITH ART":? #6:? #6;" CONVERSION PROGRAM":POKE 752,1:? "BY KEITH TSCHERNE"
515 ? :? "PRESS START TO BEGIN.";
520 IF PEEK(53279)=6 THEN RETURN
530 GOTO 520
1000 ? :? :? :? "%ERROR: ";PEEK(195):TRAP 40000
1010 ? "PRESS START TO TRY AGAIN"
1020 IF PEEK(53279)=6 THEN RUN
1030 GOTO 1020
30000 REM LOADER ROUTINE
30230 DIM LD$(117):FOR X=1 TO 117:READ N:LD$(X)=CHR$(N):NEXT X
30310 A=USR(ADR(LD$))
30320 IF A<>1 THEN RETURN
30330 GET #1,C1:GET #1,C2:GET #1,C3:GET #1,C4:CLOSE #1:POKE 712,C1:POKE 708,C2:POKE 709,C3:POKE 710,C4
30390 DATA 216,104,173,48,2,24,105,3,133,203,173,49,2,105,0,133,204,160,0,177,203,201,79,208,21
30400 DATA 169,78,145,203,165,203,24,105,2,133,203,165,204,105,0,133,204,169,0,240,14,201,15,208,6
30410 DATA 169,14,145,203,208,4,201,65,240,17,165,203,24,105,1,133,203,165,204,105,0,133,204,169,0
30420 DATA 240,198,162,16,169,7,157,66,3,169,0,157,72,3,169,30,157,73,3,165,88,157,68,3,165
30430 DATA 89,157,69,3,32,86,228,189,67,3,133,212,169,0,133,213,96
30500 RETURN
```



IBM Images

Susan Glinert-Cole

We finally got a PCjr a few weeks ago, and I found some time to play around with it. It is a cute machine, but after having scratched my way to computer literacy with a PC for over two years, I can't help but feel disappointed in jr. The two biggest faults with the machine are its keyboard and its speed.

The keyboard, despite the rationalizations and justifications on the part of IBM about its being peanut butter-proof, is just plain terrible. The keys are fairly flat on the top—a particularly inconsiderate design decision. They have a very poor feel, are wobbly, and have a peculiarly unpleasant texture. What is even more irritating is the fact that the letters are silk-screened behind each key onto a medium grey background, making them very difficult to see. It takes two keystrokes to make a function key on this keyboard; one to press the FN key and thus toggle the "function" mode, and one to press the number key desired. Touch typing, or even reasonably quick typing, is out of the question.

While the keyboard problem can be resolved by purchasing a third-party offering, the slowness of the system cannot be overcome so easily. The PCjr handles video memory in a different manner than the PC and PC/XT. In the latter machines, the video memory is dual-ported, that is, it is accessible to both the 8088 and the video display chip at the same time. In the PCjr, however, the video memory is alternately accessible to the CPU and the video display chip. The two chips must wait, if necessary, for their respective turns. The result of all of this is that you can forget about zippy screen updates; letters creep out of the display like sleepy little animals emerging from a warm hole in the ground. One company, which manufactures an excellent set of games for the PC, said that they were having trouble converting their games to the PCjr because of the slow video update problem.

One of the better features of the PCjr is its documentation. Manuals like the Guide to Operations and Basic Self Tutor are clearly written and illustrated with cheerful and colorful drawings. They are certainly oriented toward the younger set in many places, although I would imagine that a child of, say 12, might find the drawings childish and the prose sometimes heavy going. The manuals epitomize the undecided nature of the machine: it is somewhat inadequate for serious use but a trifle expensive for a toy.

One of the better features of the PCjr is its documentation.

I looked at several of the software offerings that IBM is currently selling for the PCjr and, in general, was not terribly impressed. A few random samplings of these packages are described below. One thing to take heart from: many software packages for the PC will run on jr without any trouble at all, so the selection is not really as limited as it might seem at the outset.

HomeWord

The word processor that showed up with the PCjr is *HomeWord*, by Sierra On-Line. Like many of the IBM offerings for this machine, the product is packaged in a plastic box large enough to hold a cassette, a slim instruction manual, a paper template and a disk. *HomeWord* itself does not come on cassette; one copy-protected disk is supplied, and a backup costs $20.

The *HomeWord* disk is required only during startup, after which it is replaced by a data disk. Startup will cause impatient people some mild agony, because the program grinds out several colorful screens before getting down to the business of word processing.

In keeping with the simplistic concept of the PCjr, the manual and software are icon-, rather than prose-oriented. This is a positive feature for some people, especially young ones. The first work screen presents pictures of a filing cabinet, a printer, an exit sign, two indeterminate sets of rectangles which represent layout and editing, and a group of lines that stand for preset values. Underneath each picture is a prose description of the object: printer, files, exit, and so on.

Throughout *HomeWord*, the way to get things done is to slide a grey rectangle around the screen until it surrounds the icon of your choice. If you want to print a document, for example, you use the cursor keys to move the rectangle to the picture of the printer and press ENTER. When such a selection is made, a clear English message appears on the screen telling you what you have just se-

lected and what you can do next. If you get tired of playing with pictures, there is a full set of CTRL (or ALT) key assignments that will let you call out a function directly.

HomeWord is very easy to use, and it is rare to have to consult the manual for information. The program is also reasonably flexible; text can be moved, copied, erased, searched, replaced, and printed. Layout alternatives include setting top/bottom/right/left margins, setting spacing and tab stops, justifying text, and centering lines. Unfortunately, the screen can become amazingly busy very quickly, because formatting instructions are spelled out in bright red letters whenever they have been set within the text. If the margins have been set to 10 and 80, for example, one line in the document will scream: SET LEFT/RIGHT MARGINS 10,80.

There are several nice touches in *HomeWord:* you can save a document in ASCII and do a "page preview" to see how the layout looks on the printer. While editing, if you choose to keep the icons on the screen, a square in the righthand corner reflects the way the text looks on the current page. There is a tiny red flashing dot where the cursor is currently located, too. This is cute, but each time you touch the keyboard, the preview square is updated and this takes a second or two. Which brings me to the biggest problem with *HomeWord*: it is agonizingly slow.

Even though touch typing is impossible on the keyboard, a moderate hunt and pecker can outpace *HomeWord.* The display was anywhere from two to twelve letters behind the keyboard, and this can be irritating for all but the most patient of souls. If you are used to fast word processing on a PC, *HomeWord* will drive you nuts.

Adventures in Math

An inventive and clever educational game is *Adventures in Math.* Here, you must find your way around the castle, solving math problems so you can collect treasures and open doors. It is a graphic adventure; that is, as you move around, the scenes change, and just as in text adventures, you can get very lost. The object of the game is to collect all the treasures and get out of the castle. I found it a very well done and entertaining little package, and this disk is not copy protected. The only objection I have is that the scenes are all in the same boring magenta-cyan-white-black palate so familiar to PC owners. I am mystified. After all, one of the big selling points of the PCjr is the 16 colors in graphics mode. I guess that this and other games are done in the old colors to make them compatible with the PC, but that isn't taking good advantage of what the PCjr can offer in terms of pretty displays.

Drawing Circles Around the Jr

Robert Alonso submitted the program in Listing 1 and a description for drawing a circle with PCjr.

```
PCjr. Circle                          02/05/84

The Program:

          10 CLS: SCREEN 1
          20 COLOR 6: X=160: Y=100: R=30
          30 FOR XZ= X-R TO X
          40 FOR YZ= Y-R TO Y
          50 D= SQR((X-XZ)^2+(Y-YZ)^2)
          60 DL= INT (D): DU= INT (D+.5)
          70 IF DL=R OR DU=R THEN GOSUB 90
          80 NEXT YZ: NEXT XZ: END
          90 PSET (XZ,YZ): PSET (2*X-XZ,2*Y-YZ)
         100 PSET (XZ,2*Y-YZ): PSET (2*X-XZ,YZ)
         110 RETURN
```

Listing 1. PCjr CIRCLE Program.

The IBM PC has satisfied many an executive's colorful pie chart dreams with the CIRCLE instruction available from BasicA. This command allows quick and easy creation of a colored circle anywhere on the screen. CIRCLE however, is not included in the standard cassette Basic that comes with the PCjr.

Homeword is very easy to use, and it is rare to have to consult the manual for information.

Owners of PCjr who would like to draw perfect circles at will on the display have two choices: buy the advanced Basic cartridge or write a program that will substitute for CIRCLE. I chose the latter avenue.

While CIRCLE is absent from the command set, the PCjr does have the PSET instruction, which will plot a point anywhere on the screen. PSET, in conjunction with a simple coordinate geometry formula, is the key to creating a circle drawing routine. The formula used is based on the fact that a circle is simply a series of points equidistant from the center. The distance formula in line 50 is used to test whether points generated by the nested loops XZ and XY are R units away from the center. The center is determined by the values assigned to X and Y in line 20, and the distance from the center to the circumference is determined by the value assigned to R in the same line.

Although the combination of PSET and the distance formula facilitates the circle plot, there still remains the problem of time. Interpreted Basic is a very slow language. Drawing a circle can become a "take-a-coffee-break" experience. The logic behind the original routine was that all the points belonging to a circle with (X,Y) coordinates and a radius R would have to be within a square created by the points (X-R,Y-R), (X+R,Y-R), (X+R,Y+R), (X-R, Y+R). I used nested loops to test every (X,Y) combination of points within the square and to plot those that were approximately R units away from the center. This method works, but is very time consuming.

I then thought about creating an arc in one quadrant of the circle and reflecting it to the other three quadrants. By employing a trick I'll call "mirroring," the program draws a circle about 75% faster than the brute force method. If you look at the program listing you will notice that there are formulas within the PSET statements in lines 90 and 100. These are the ones that do the actual mirroring.

The program is designed to work in medium-resolution mode (SCREEN 1), but you can easily modify it to work in high-resolution mode by eliminating the COLOR command and changing the SCREEN command to SCREEN 2. You can also use the program as a subroutine in one of your own programs by eliminating the CLS instructions and renumbering this program appropriately. Don't forget to replace the END statement with a RETURN instruction. Also, make sure that the variable names used in this subroutine are not also used in the body of the main program.

```
 Volume in drive C is SURLYSOFT
 Directory of  C:\

COMMAND  COM     17664   9-09-83  11:17a      XBENCH          [dir]   1-01-80  12:02a
ANSI     SYS      1664   3-08-83  12:00p      WP              [dir]   1-01-80  12:05a
CONFIG   SYS        39   1-11-84   4:26p      GAMES           [dir]   1-01-80  12:07a
AUTOEXEC BAT        97   1-06-84   3:13p      UTIL     DOS    [dir]   1-01-80  12:09a
SC               [dir]   1-27-84  12:33p      UTIL            [dir]   1-01-80  12:09a
DBASE            [dir]   1-27-84  12:31p      WORKING         [dir]   1-01-80  12:12a
PEDIT            [dir]   1-27-84  12:27p             13 File(s)   4456448 bytes free
```

Figure 1. Susan's Root Directory.

```
echo off
cls
path c:\;c:\util.dos;c:\util;c:\wp;c:\pedit
astclock
chkdsk/f
prompt [$p] $g
```

Figure 2. Susan's AUTOEXEC.BAT File.

How to Lose Ten Pounds of Floppy Disks

Of all the various parts and pieces of my computer system, the one that I would have the most difficult time parting with is the fixed disk. I acquired this wonderful gadget about two months ago from Apparat, and have been entirely satisfied with its performance, although setup was not exactly a piece of cake because of some flaky chip or another on the disk controller board.

This disk is best referred to as an IBM emulator: all software that can be installed or used with the IBM fixed disk can theoretically be used with Apparat's with no software drivers. Strictly speaking, however, this statement really applies to all software and hardware that uses legitimate system calls to the disk controller and does not trespass in any way on address lines that IBM has reserved for the fixed disk.

I have had only two problems, both of them network installations, and in both cases the conflicts were traced to "not-quite-cricket" behavior on the part of the network manufacturers. In one case the company used several reserved fixed disk address lines in implementing the network, and in the other case the software bypassed the legal system calls and tried to talk directly to the disk controller.

The fixed disk itself looks like a Miniscribe and is housed in a grey and beige metal cabinet. The unit is about half as wide and about three-quarters as long as the PC system unit. The hard disk controller board, which also has an RS-232 port on it, must be installed in the main system unit. You cannot place it in an IBM expansion chassis if you happen to have one.

No special software is required for installation; all setup is done with the PC-DOS FORMAT and FDISK programs exactly as described in the DOS manual. If you are possessed of an antique 64K motherboard and want to be able to boot directly from the fixed disk, Apparat supplies a ROM and instructions for removing the old ROM chip from the U33 socket and replacing it with the new one. This step is unnecessary if you have the newer 256K motherboard. Having one of the ancient system boards, I had to perform this little exercise which, although not particularly difficult, requires removal of all expansion boards to get a clear view of the socket.

Ten megabytes is a lot of storage space, and demands a different philosophical outlook on disk organization from ten pounds of floppy disks.

Once the disk is installed, you can start feeding files into it. Ten megabytes is a lot of storage space, and demands a different philosophical outlook on disk organization from ten pounds of floppy disks stored carefully in little plastic boxes. Several people, having been floored by a directory which suddenly contained 342 files, have requested that I describe an approach to fixed disk organization. The problem here, of course, is that everyone has a personal preference for a certain kind of order (or chaos, as the case may be). The principles of erecting a hierarchical directory, however, are the same no matter how you see fit to apply them.

First of all, recall that DOS 2.0 will support a system of directories which can themselves contain files and subdirectories. The subdirectories in turn can contain further subdirectories and files; this scheme can be continued until you run out of disk space, patience, or both. Although the root directory has a limit of 512 entries, the subdirectories are themselves files, and have only the practical limit of disk space on their contents.

Beginning at the top of this directory tree is the *Root* directory. It is usually described as drive C:\, and can be assigned a volume name. Figure 1 shows my own root directory. As you can see, it contains only four files, and these particular ones *must* reside in the root directory for them to be located by the system. Other files which must reside there are device drivers and any programs you call from AUTOEXEC.BAT *if* they are called prior to a PATH specification within the start-up file.

The PATH command tells the system where it is to look for files whenever it cannot find what it needs in the default directory. Figure 2 shows my AUTOEXEC.BAT file, and you can see that my PATH command tells DOS always to look first in the root directory (C:\), then in the subdirectories C:\UTIL.DOS, C:\UTIL, C:\WP, and C:\PEDIT. If DOS still cannot locate a file, it will give the error message: BAD COMMAND OR FILE NAME or something equally depressing. You can assign a path at any time, but placing an extended search path into the AUTOEXEC.BAT file allows you to place programs (but not device drivers) to be run at startup in other, more sensible directories. This keeps the root directory clean and enables you to keep better track of things. For example, you can see from my AUTOEXEC.BAT file that the program ASTCLOCK, which is not located

COMPUTERS FOR KIDS!

COMPUTERS FOR KIDS!

By Sally Greenwood Larsen

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IBM Images, continued...

in the root directory, is called after the path assignment; the system uses the assigned path to locate this program in one of the subdirectories (specifically UTIL).

I consider myself a fairly eclectic computer user: I do programming, word processing, and database management; play games; and fiddle with financial matters. My subdirectories reflect this general orientation. SC contains *SuperCalc 3* and its ancilliary files, DBASE contains *dBase II,* PEDIT contains the screen editor PEDIT, WP holds the word processor *WordPerfect,* and so on.

Under the WP directory are several subdirectories: LETTERS, IMAGES, PERSONAL and others. Because *WordPerfect* handles path names with aplomb and has commands for changing the current subdirectory, I find this subdivision of text material very satisfactory. Other word processors might not be so flexible about path names, so you might be reduced to 1) keeping all word processing material, including the program files and your own text files, in one gigantic subdirectory or 2) copying the desired working document of the moment into the subdirectory that contains the word processor. If you are in the market for a word processor, it will ease your life considerably if you buy one that can handle path names without choking.

SuperCalc 3 will not handle subdirectories at all, so all files that I generate with this program are lumped together in that one directory. Depending on how much work you are willing to do to keep a disk organized, you can sort your own files manually from DOS into the appropriate directories, and then copy the ones you are interested in at the moment into the main *SuperCalc* directory. This procedure, of course, also applies to any program that will not handle path names.

The subdirectory WORKING contains all the compilers I am wont to use. Each compiler, along with its requisite files, is placed in its own subdirectory. There is one more layer under each compiler directory too, called OLDFILES. This directory contains old programs and assorted fragments that I want to keep around for a while, but am not presently working on.

Because the PC-DOS linker, LINK.EXE, is in \UTIL.DOS and can thus be found by the system, it is not necessary to have separate copies of LINK.EXE in all the compiler subdirectories. The only caveat to this is that if you want to link two files which are in separate subdirectories, LINK.EXE will get lost, because it cannot handle path names.

One way to handle this problem, if you do a lot of program generation, is to keep all .OBJ files, regardless of their linguistic origin, in one directory and do all linking from inside there.

The prompt command in the AUTOEXEC.BAT file, sets the prompt to display the current directory, surrounded by square brackets and followed by the usual > character. I, therefore, always know where I am (at least from a directory standpoint) without having to ask the system. And if you were wondering how I got the directories in the listing to appear with square, rather than angle brackets, I refer you to a prior "Images" that talked about using DEBUG to get inside of COMMAND.COM. I think the square brackets look neater than the defaults and are easier to distinguish from files as well.

Caging the Terrible Decibel

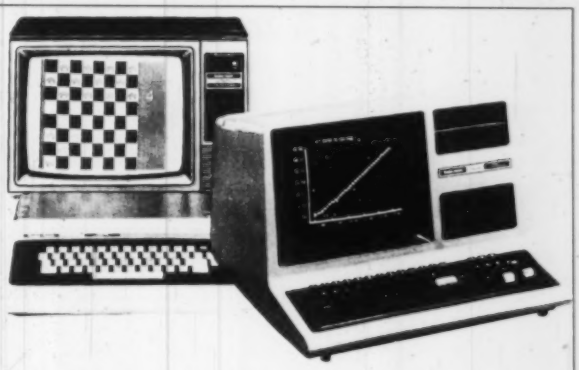
Although my word processor can print and edit documents concurrently, I usually do not take advantage of this feature because of the noise factor. My printer generates such a racket that I usually have to leave the room while it is screeching and clanking its way to hard copy. I have been looking around for a sound control printer stand and finally found one that is beautifully designed and engineered and actually diminishes the noise to a mere shadow of its former self. It is perfectly possible, for example, to stand next to the printer stand and talk on the telephone in a low tone. Formerly, the telephone was unusable as a communications device even twenty feet from the printer.

The top of this printer stand is clear acrylic for visibility and is mounted on a special hinge that supports the cover when you lift it up. The cover is mounted slightly away from the base, to allow paper to be fed into back-loading printers. The interior is lined with acoustical foam, and there is a slit in the bottom to accommodate bottom-feed printers. About 4" of paper can be placed underneath. There are several different models available for a range of printers, so check with the manufacturer for prices and availability. Apogee also makes monitor stands, floppy disk boxes, and a neat device that allows you to mount a full-sized CRT on top of a portable computer like the Osborne.

Firms Mentioned in this Column

Apogee Designs
3100 Fallscliff Rd.
Baltimore, MD 21211

Apparat
4401 S. Tamarac Highway
Denver, CO 80237



TRS-80 Strings

Stephen B. Gray

Pausing at bar 64 of the Tandy concerto for TRS-80 and users' orchestra, we see onstage the SCM L-1000 daisywheel printer, Radio Shack's own color ink-jet printer and screen dump, and a short program that calculates large factorials, such as 50! and 100!

SCM L-1000 Printer

The Smith-Corona letter-quality TP-I daisywheel printer was reviewed here (Nov. 1982, p. 310) as a good machine with a slow speed that matched its low price. Its successor, the TP-II, was seen by John J. Anderson (Jan. 1984, p. 234) as "redressing some of the problems of the original model," producing "impeccable . . . hardcopy output," but still slow, unidirectional, and noisy.

The TP-II was an interim model, introduced in September 1983, and replaced in January 1984 by the TP-II Plus, which almost immediately was renamed the SCM L-1000, apparently in an attempt to change the image of the printer and/or the manufacturer.

The TP-II Plus, also an interim model, carried a suggested retail price of $645. The L-1000, which SCM assures me is exactly the same printer except for some cosmetic changes, is $545. SCM says the $100 reduction is due to their "making more of them, and also to market demands." Translation of the second part: competition from $500-or-so daisywheel printers from the Orient forced the price down.

The L-1000 (Figure 1) improves even more on previous models. It now prints bidirectionally, and can do so in three pitches: 10, 12 and 15 characters to the inch.

It's still slow, at 12 cps, but provides handsome output at a low price; it can be bought in New York City for less than $440.

The print buffer has been expanded from 256 characters to 570; if you turn off your TRS-80, the L-1000 will keep on printing for about 20 seconds.

L-1000 Printwheels

Five easy-to-change 10-pitch print wheels are available, along with five 12-pitch wheels, and one for 15 characters to the inch. The one for computer use is the ASCII Tempo 10/12 wheel, which includes greater-than, less-than, backslash, up-arrow and other such characters. This particular wheel is designed to look good at either 10 or 12 cpi (Figure 2).

Tempo 10 is a 10-cpi non-ASCII printwheel, with a nice modern looking font that is slightly different from the ASCII Tempo 10/12. Regency 10 is a modern version of standard pica.

Figure 1. The SCM L-1000 is an improved version of the TP-II; it prints in both directions, and can do so at three pitches.

Any of the SCM printwheels can be used at any of the three different pitches. The 15-cpi pitch is rather tight, but permits squeezing the maximum amount of text onto a line.

SCM Ribbons

Three different types of easily changed ribbons are available for the L-1000. The least expensive (around $4.75) is a reusable fabric (nylon) ribbon, which gives good printing. The non-reusable multistrike mylar film ribbon costs more (about $9.50), but gives better printing; the film is moved over just enough each time so that the next character uses some of the same area as the previous one.

Single-strike film gives the best printing, and costs $4.50 or so. This one-time film provides a new print area for each character, thus providing top-quality sharpness and clarity. It costs less than multistrike film because it provides far fewer impressions per inch.

The L-1000 comes supplied with a multistrike mylar film ribbon.

```
The ASCII TEMPO 10/12
at 10 cpi: < > ^ \ |
and many other signs.
Same: 12 letters an inch.
Again: 15 letters to the inch.
Tempo 10 is the non-
ASCII 10-pitch wheel.
Regency 10 is a mod-
ern pica style.
```

Figure 2. Of the dozen printwheel fonts designed for the SCM L-1000 printer. these are some of the most attractive.

Software-Controlled Features

The L-1000 has 19 special control codes for turning a variety of features on and off. For example, underscoring can be performed three ways. To underscore one character, transmit the character to be printed, then the backspace code BS, followed by the underscore character.

To underline individual words—but not the spaces between them—send an ESC-Z code; stop the underlining with ESC-R. To underline everything, send ESC-E. ESC is sent as CHR$(27).

The left margin can be set by ESC-9 and released by CAN. Tabs can be set with ESC-1, removed individually by ESC-8 or all together with ESC-2. After the tabs have been set, ASCII code HT will move the printwheel carrier to the next set tab to the right.

Bidirectional printing can be enabled with one code and disabled by another. Pitch can also be changed from the computer, by sending three CHR$ codes: CHR$(27) for ESC, CHR$(31) for setting pitch, and CHR$(12) or CHR$(10) or CHR$(8) for pitches 10, 12, or 15 cpi, respectively.

Other control codes set the top and bottom margins, as well as page length.

Under a back panel plate are 14 DIP switches that control other features, such as character length, parity, baud rate, and whether or not a carriage return is accompanied by an automatic linefeed. For the TRS-80, all you need do is turn on that last one, otherwise the paper will never space up.

A top-of-form switch permits positioning continuous-form fanfold paper and responding to the ASCII form-feed character, CHR$(12), to advance the paper to the top of the next sheet. This requires a tractor feed, available at $149 list.

Both RS-232 serial and Centronics parallel interface ports are provided. The serial interface has both hardware and software handshake protocols.

User Comments

I've been using the L-1000 since it was the TP-II Plus (and the TP-II long before that) for printing out this column and am quite satisfied with it. There is only one problem; now that it's bidirectional, it prints a little too fast for me to be able to stop it every time just where I want to by raising the cover, which activates the "pause" switch.

If you're printing the same type of material over and over, you eventually learn how to set the controls to print exactly what and where you want. But if you do a variety of printouts, you may not be able to get each one right the first (or second) time, every time. So it's handy, if you are printing only one or two of something, to be able to stop the printing and move the paper up or down to change where the next line will appear.

This is impossible, of course, with a fast printer. But with a slow one, you can catch it at the end of a line, in the case of the TP-II, by just raising the cover. The L-1000 requires a faster hand, which is one way of keeping in training for video games.

The TP-II had one thing I wish the L-1000 had: a hinged plexiglas cover over the platen which functions as a dust-cover when the printer isn't being used.

Color Ink Jet Printer

Computer printout in color is a complicated process, and only recently has become available at prices the personal computer owner could reasonably afford.

Up until not long ago, the only color printers available for personal computers used multicolor ribbons with noisy mechanisms whose many moving parts often wore out too fast. Long printing times and unimpressive color reproduction were additional drawbacks.

Ink jet printers have been around a while. But there were several interrelated problems involving ink, nozzles, and printing speeds. For example: how to make the ink dry fast enough on the paper so it doesn't smear, and yet not have it dry up inside the printer.

Several ink jet printers that solve most or all of the problems have become available recently, including one from Radio Shack.

CGP-220 Seven-Color Ink Jet Printer

Radio Shack's TRS-80 CGP-220 Color Ink Jet Printer (Figure 3), priced at only $699, prints in seven colors, both text and graphics, so quietly you can barely hear it. The parallel interface permits using any TRS-80 computer; the serial interface is compatible with the Color Computer.

In graphics mode, the CGP-220 prints with a maximum resolution of 640 dots per line. Text is printed at 37 characters a second, 12 to the inch, on a 7-by-5 matrix.

A screen dump utility allows the CGP-220 to create four-color printouts of color screens produced by graphics programs on a 16K Color Computer.

The CGP-220 contains two ink packs, which are said to print up to 4 million characters: the black pack is $9.95; the three-color pack is $14.95. The printer takes roll paper ($9.95 for three) or sheet paper ($6.95 for 250 sheets; this is a plas-

Figure 3. The CGP-220 prints text and/or graphics in seven colors, and is very quiet.

"...Why the tap dance mode?"

tic-impregnated paper that the ink doesn't soak into, as it usually does into bond paper).

Text Mode

If you want to check out the ink jet printer, turn the power off, press the FEED switch, turn the power back on, and all the standard alphanumeric symbols will print, each line in a different color, until you turn the printer off.

Connect the CGP-220 to a "black-and-white" computer, such as the Model 4, and it's in text mode when you turn it on. You can use all the features of the printer from within a Basic program by using any of 14 control codes which control the mode selection, linefeed, carriage return, elongated characters, dot-pitch selection, printhead positioning, character repetition, color selection, etc.

Characters can be printed twice as wide as normal with control codes 27 and 14. Most multiple-code sequences begin with 27, the ESCape code. Code 14 starts character elongation; code 15 terminates it. Enter these lines, as printed by a CGP-220:

```
10 LPRINT "NORMAL CHARACTER"
20 LPRINT CHR$(27); CHR$(14);
30 LPRINT "ELONGATED"
40 LPRINT CHR$(27); CHR$(15);
50 LPRINT "BACK TO NORMAL"
```

and run the program, and you get

```
NORMAL CHARACTER
ELONGATED
BACK TO NORMAL
```

If you had wanted to print that three-line message in red instead of black, you'd have to add this program line:

5 PRINT CHR$(27); "T"; CHR$(49)

where "T"—or its equivalent CHR$(84)—selects colors, and 49 is the code for red. To print the message in green, use code 50; in yellow, code 51; etc.

Normally, dot pitch is set at a 4:3 ratio, meaning the printed characters are slightly higher than they are wide. To print characters that are as wide as they are high with a dot-pitch ratio of 1:1 as in the center line of these three:

```
NORMAL DOT PITCH
1:1 RATIO DOT PITCH
BACK TO NORMAL DOT PITCH
```

you need control code 78 (or N) to start them, and code 80 (or P) to return to the normal 4:3 pitch.

Bit Image Mode

The CGP-220 prints in two different graphics modes with different resolutions; you have no pre-defined characters, so you have to program the printhead to print dots where you want them and in the color you want them.

In Bit Image mode, you can address 640 dots on a horizontal line and seven dots vertically at a time, for a total of 4480 dots. First you send the printhead to a specific dot-column, then you tell it which of the seven vertical dots to print. You can print them in any combination. The dots have binary address numbers: 1, 2, 4, 8, etc. So you add up the numbers of the dots you wish to print and put the sum in the program line that specifies which dots are to be printed where.

Colors are designated in Bit Image mode the same as in Text Mode.

The CGP-220 manual provides brief examples of printing in the Bit Image mode, but doesn't mention the obvious: you could go out of your mind programming the screenful of dots required to create full-resolution color graphics.

What is needed is some sort of etch-a-sketch program, to let you easily create graphics with the CGP-220. This can be done indirectly with the $34.95 *Micropainter* program. However, *Micropainter* is actually a coloring book program; you load one of eight pictures into the computer, and "paint" it in, which isn't very creative.

Color Scan Mode

The CGP-220 Color Scan Mode "is somewhat like the Bit Image Mode, but it allows for greater manipulation of color, requires a great deal of attention to detail, and consumes a lot of memory space," according to the manual.

Just to be different (and confusing), Color Scan Mode involves dots in horizontal rows with each line of 640 dots divided into 80 dot-rows of eight dots each.

The eight dots per dot-row also have binary address numbers; just as in Bit Image Mode, so you add the binary numbers of the dots you want to print. In Color Scan Mode, you control the colors of the individual dots.

The manual includes a five-line program that prints three rows of dots with three color dots in each dot-row and all the other dots black.

Color Scan Mode is even more complicated than Bit Image Mode and needs even more some way to simplify creating graphics.

Color Computer Screen Dump

With Radio Shack's $9.95 *Hi-Res Screen Print Utilities* program, you can reproduce graphics from a 16K Color Computer (Figure 4). One catch is that the graphics must have been created with a program in Basic, so you can't dump the display of the Color Computer games, which are on machine language ROM Program Paks.

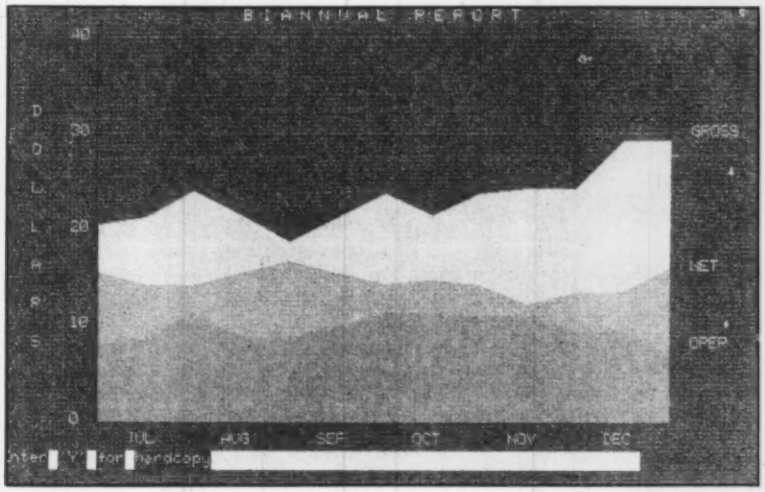


Figure 4. This screen dump from a Color Computer was made with the Hi-Res Screen Print Utilities program from Radio Shack.

The screen dumps are in black and white or in four colors. You have the option of selecting the background color (green, black, or white); the three other colors are different for each background color.

For black-and-white screen dumps only, any Radio Shack (or compatible) dot matrix printer with full bit image capabilities can be used, including the LPVII, LPVIII, and DMP 100, 110, 200, 400 and 420.

CGP-220 Bottom Line

Although the TRS-80 CGP-220 Color Ink Jet Printer is a fascinating machine, its graphics modes are just too complicated to use, and the screen dump is limited to Basic programs. Also, there is a lack of some features found in other dot matrix printers in the same price range, such as boldface, italics, proportional spacing, and underlining.

So, unless you're a hardcore printer enthusiast, or a die-hard graphics fan, the CGP-220 may not be for you—at least not until the graphics modes are easier to use and the screen dump works for machine language programs too.

Short Program 48: Factorials

From Burlington, IA, Francis S. Horton wrote a letter that has this fine bit of computer-generated art on the first page:

Francis says he has "been a TRS-80 'freak' (and booster) since 1978." Then he says, "A few years ago, after discovering that a TRS-80 'overflows' before getting very far with factorials, Donald Wemmis, a mathematics and programming instructor at Southeastern Community College in Burlington, wrote the following program. To the best of my knowledge it has no upper limit, if you have a few days to do without your computer while it makes the computations and prints the answers. I've seen the results of calculating the factorial of 1000. I've forgetten the number of digits in the answer, but you wouldn't believe me anyway. Here 'tis set up to calculate 50 factorial (Listing 1). Just raise the limits and go for broke."

To make the program calculate 100 factorial, change the 50 in line 20 to 100 and change the 100s in lines 10, 30, 40, and 60 to 200. (Do *not* change the 100 in line 80 to 200.)

The letter ends with another nice piece of dot-matrix art:

Listing 1.

```
10 DEFINT A-Z: DIM A(100),B(100):A(100)=1
20 FOR N=1 TO 50
30 FOR I=100 TO 100-2*N+1 STEP -1: A(I)=A(I)*N: NEXT I
40 FOR I=100 TO 100-2*N+1 STEP -1: C=INT(A(I)/10)
45 A(I-1)=A(I-1)+C: A(I)=A(I)-10*C: NEXT I
50 PRINT N "FACTORIAL IS ";
60 FOR I=100-2*N TO 100
70 B(I)=B(I)+A(I)
80 IF B(I)=0 THEN 100
90 PRINT A(I);
100 NEXT I: PRINT: PRINT: NEXT N
```

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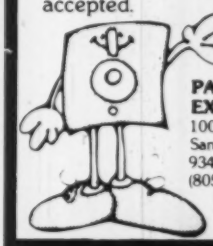

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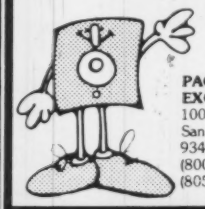

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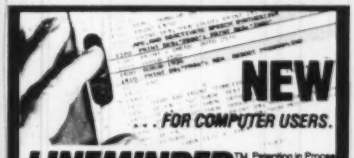

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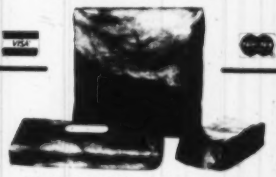

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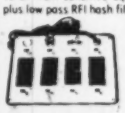

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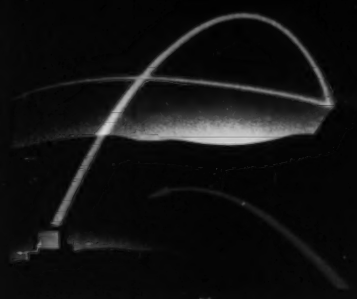

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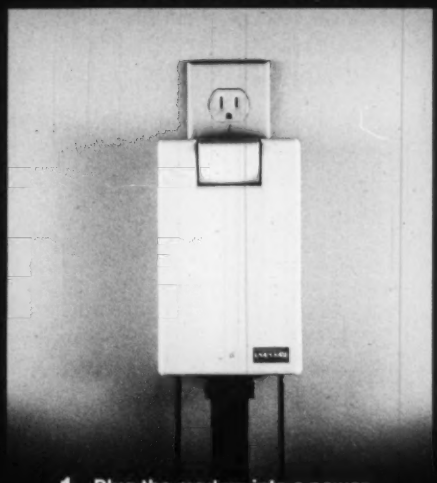

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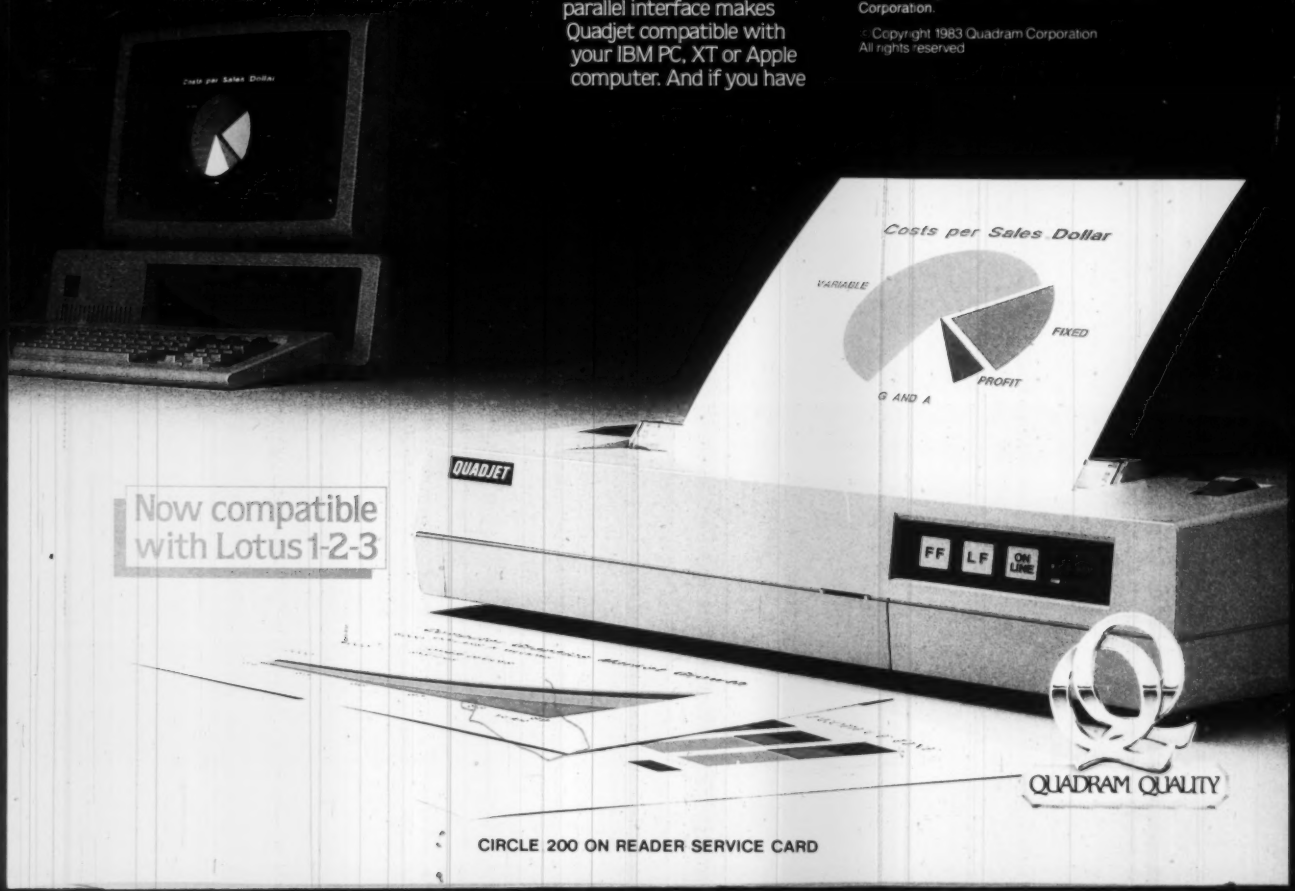

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